IPPF
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Family Planning Handbook

for Midwives and Nurses

3rd EDITION

INTERNATIONAL PLANNED PARENTHOOD FEDERATION

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Family Planning Handbook

for Midwives and Nurses

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3rd edition 1986

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Preface

During the past 25 years, the International Planned Parenthood Federation (IPPF) has published a wide range of booklets for doctors and other health workers on various aspects of contraception and allied subjects. Of these, the *Family Planning Handbook for Midwives and Nurses* has been one of the most widely used. It was first published in 1971, with a revised second edition in 1976, and several reprints in addition.

The present third edition has been completely rewritten. The part played by midwives and nurses in family planning, especially in developing countries, has been kept firmly in mind. There is an important opening chapter on motivation and counselling, followed by a description of all methods of contraception, which is accompanied by a comprehensive table setting out their attributes, including advantages and disadvantages. Then all the present-day methods of contraception, not forgetting the important part played by breast feeding, are discussed briefly, with up-to-date information about their use. A chapter on pregnancy includes ways in which midwives and nurses, working in the community, can help couples to have healthier babies through the advice they can give on pre-conception care. Amniocentesis and the detection of congenital abnormalities or some hereditary diseases is discussed, and there is a short outline of the position of abortion in present-day society and the role of midwives and nurses in dealing with this sensitive subject. Finally, there is a chapter setting out ways in which midwives and nurses can play a positive role in advising and helping couples who suffer from infertility.

The booklet has many illustrations, and there is a central section which may prove useful to the midwife or nurse in explaining to individuals and couples how and where various contraceptives are used in relation to the body's anatomy. This section is meant as a visual aid in showing, for instance, how an intrauterine device lies in relation to a woman's body, or how the vasectomy operation is carried out.

It must be emphasized that, although this booklet contains much information on contraception, it is not in any sense meant to be a text book on the subject. It may be used with confidence by midwives and nurses to obtain an overall picture of the subject, and should be useful background material in any training course. However, we feel that only proper practical training can enable all health workers to provide a full range of contraceptive services.

The draft of the new edition was written by Dr Geraldine Howard, formerly an obstetrician-gynaecologist at the Charing Cross Hospital, London and a well-known family planning expert. She spent many years working in developing parts of the world, particularly in Africa. Many other experts looked at the text and commented on it, for which we thank them. They include the members of the IPPF International Medical Advisory Panel (IMAP) and the IPPF Medical Editorial Advisory Board. Representatives of The World Health Organization, the Centers for Disease Control, and Family Health International gave valuable advice. Others who helped include Ms Margaret Brayton of the Commonwealth Nurses Federation, Ms Doris Krebs of the International Council of Nurses, and Ms Gill Tremlett, Nurse-Midwife Training Co-ordinator, Botswana, who drew on her extensive experience in developing countries.

Introduction

Family planning, like all other health care, depends on a team of people. Midwives, nurses, health visitors, doctors, auxiliaries, social workers and clerical staff all work side by side in order to provide the best possible advice and care for those who need help. Teams such as this are found in most countries, although the exact composition of the team and the type of work undertaken by each member may differ. In some countries, trained members of the community are involved in counselling and in distribution of contraceptives as well.

This book has been written to help midwives and nurses play their full and very important role in family planning. The exact details of the work undertaken by them will depend partly on their training and partly on the policy and practice of the local family planning association and the government health services of each particular country. Everywhere it is recognized that midwives and nurses can make a uniquely useful contribution to family planning, performing a wide and varied range of tasks.

Place of midwives and nurses in family planning

Doctors and administrators recognize that to deliver a baby is one of the most responsible and important tasks in health care, and that in nearly every country of the world midwives are in charge of a very large number, often the majority, of deliveries. By comparison with the responsibility of looking after even a normal delivery, most of the techniques involved in contraception are relatively simple. Most methods of contraception can be distributed or taught by midwives and nurses and some by paramedical workers as well. When this is not possible it is still useful to understand the method and to be able to care for the man or woman, even if a doctor has to prescribe or administer the method. Simple advice on side-effects given by midwives or nurses may be very helpful to the user.

One or two techniques of fertility regulation, such as female sterilization, are nearly always performed in hospital. In this situation midwives or nurses may assist in the operating theatre, but the details of these forms of assistance have not been included here, as they should be part of the basic training received by the midwife or the

nurse. In some countries midwives, nurses and even auxiliary health personnel have been trained to perform simple sterilization operations such as mini-laparotomies.

Why midwives and nurses should work in family planning

Nearly all individuals or couples will need family planning advice at some time in their lives, whatever their background. Midwives and nurses can play a very important role in supplying this advice.

Sometimes people may be too shy to talk about such an intimate matter, or they may genuinely not know that contraception is possible or available. Therefore, one of the more important things that midwives and nurses, as well as doctors, can do is to offer advice to people who may need it. Every woman, when she is pregnant, or when she has just had her baby (or has been treated for an abortion) should be able to have advice either for spacing her family, or for avoiding further pregnancies if she feels she has enough children. Schemes linking obstetrics and family planning information have been successfully organized in many countries. This is because many women are particularly alert to the need for contraception during pregnancy, shortly after delivery, and at the time of an abortion, and midwives will be able to be of special help to them then.

Advice during pregnancy

It should not be forgotten that family planning problems may arise at any time during a person's fertile life. Nurses undertaking general medical or surgical care may sometimes find opportunities for giving contraceptive advice that will be greatly welcomed by the patient, even in situations completely unassociated with family planning. Also, some apparently purely medical complaint may really indicate or cover up an underlying need for family planning advice.

A midwife or a nurse, because of her training and specialist knowledge, is well equipped to understand the scientific background of all methods of contraception. While this is important, the main difficulty with many contraceptive techniques is not that they are complicated but that they have to be well explained and used on a regular basis. Midwives and nurses can help by giving encouragement and explanation.

Careful teaching about a method is often more important than detailed knowledge of the physiology or anatomy which may be involved. For example, it is more difficult to take the Pill daily than to be given a vaccine for long-lasting protection against, say, poliomyelitis. Midwives and nurses often live near a woman who may have received contraceptive advice. Commonly, such a woman who has a

question about a method that she is using, or who has a minor side-effect, may be able to find a midwife or a nurse to give her help and reassurance more easily than a doctor. The midwife or nurse may be the best person, not only in instituting contraception, but also in ensuring its continued successful use. Some people need constant encouragement in order to persist with their chosen method. It must be remembered that observation has shown that often those people who most need contraceptive advice are least likely to be willing or able to travel any distance to obtain that advice. The midwife or nurse is more likely than a doctor to be able to reach the person's home or provide a contraceptive service which is convenient in place and time.

Ensuring continued successful use

Family planning and women's and children's health

The link between the health of women and family planning has been recognized by researchers for many decades. However, knowledge of this link has only comparatively recently been used to improve family planning programmes. Family planning can be broadly defined as avoiding unwanted births, bringing about wanted births (counselling and treatment of infertility), regulating the interval between births to ensure adequate spacing, ensuring births occur at the best time in relation to the age of the mother (preventing or reducing the number of pregnancies in women under 20 and over 35 years of age), and determining the number of children in the family. Of all maternal deaths, 20% occur in mothers over 35 years of age, although they only give birth to 5% of all babies.

The correlation between maternal age and infant mortality has been well documented by World Fertility Survey (WFS) data. Data from Peru, Bangladesh, Sudan (north) and Venezuela show that infant mortality is highest when the mother is under the age of 20. The infant mortality is lowest when the mother is between 20 and 29 years of age.

Birth spacing plays an important part in reducing infant mortality. When births are spaced less than two years apart infant mortality is at its highest. The lowest range of infant mortality occurs when births are spaced about four years apart. Maternal mortality is also affected by birth spacing. Some of the highest death rates have occurred in women under the age of 20 with three or more children.

Birth spacing reduces infant mortality

Family planning can help women avoid the four major types of high-risk pregnancy, and effectively reduce both maternal and infant mortality rates. These high-risk pregnancies (discussed further on page 13) are:

Pregnancies before the age of 20
Pregnancies after the age of 35
Pregnancies after four or more children
Pregnancies spaced less than two years apart

Until the 20th century, the main factor responsible for spacing pregnancies in all countries was breast feeding — a reasonably good form of natural contraception. The widespread use of artificial formulas and bottle feeding, mainly in developed countries, has resulted in greater use of other forms of contraception. Where these are not easily available, or where for a variety of reasons couples are not using them, breast feeding can still be a significant factor in spacing births. Apart from its other important functions, breast feeding should be encouraged by midwives and nurses for this purpose, where it fits in with the woman's life-style. In developing countries breast feeding often lasts between one and three years, and the longer a woman breast feeds, particularly when this takes place without supplementation, the longer before ovulation returns (see page 58).

Breast feeding important

Wider aspects of family planning work

In many parts of the world doctors, nurses, midwives and auxiliaries have been successful in curing and preventing diseases and, most especially, in reducing the risk of mothers dying during delivery and of babies dying in their first year of life. In past centuries it was common for a couple to have a large number of children, but usually only two or three survived to be adults and have families of their own. A new situation has now arisen in many areas, where most or all of the children born in each family are surviving to be adults.

In certain countries the rate of population growth is becoming an important problem in their economic and social development (Fig. 1) and many governments now have policies to try to slow the rate of population increase. Indeed, some countries are now doubling their populations every 17-20 years. Often the government and the people know that their country can sustain a very much larger population than it has at the present moment, but they also know that, in order to build the schools, hospitals and houses that the people will need, it would be an advantage if the population grew far more slowly. A large proportion of the population in many developing countries is under 15 years of age with the potential of many extra parents in the future, with even more children (Fig. 2).

Population growth high

Fig. 1 *The number of people in our world in 1980 and projected to 2025 divided by age groups from 0–4 to 80+ in five-year steps, showing the differences in the developed and less developed countries.*

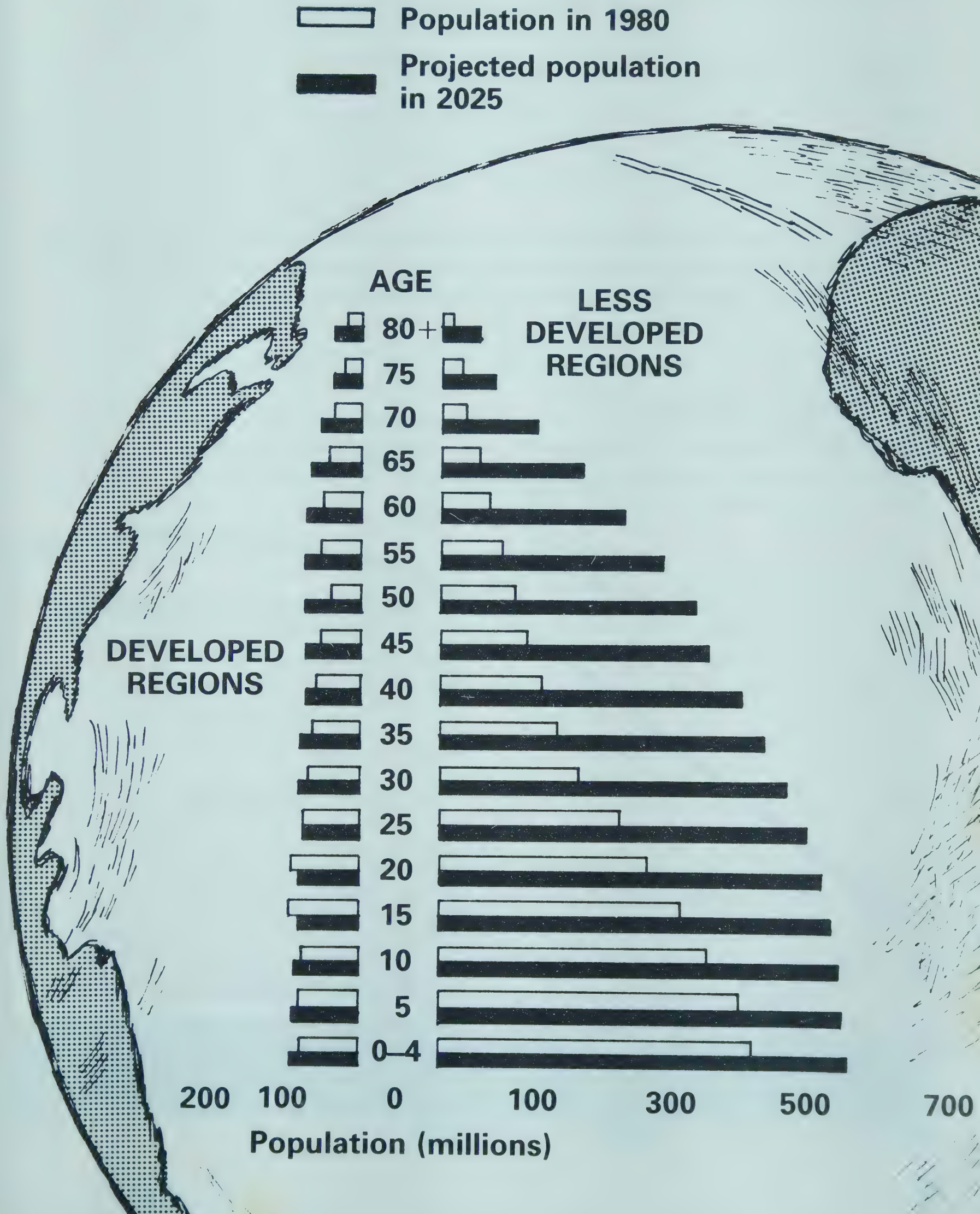
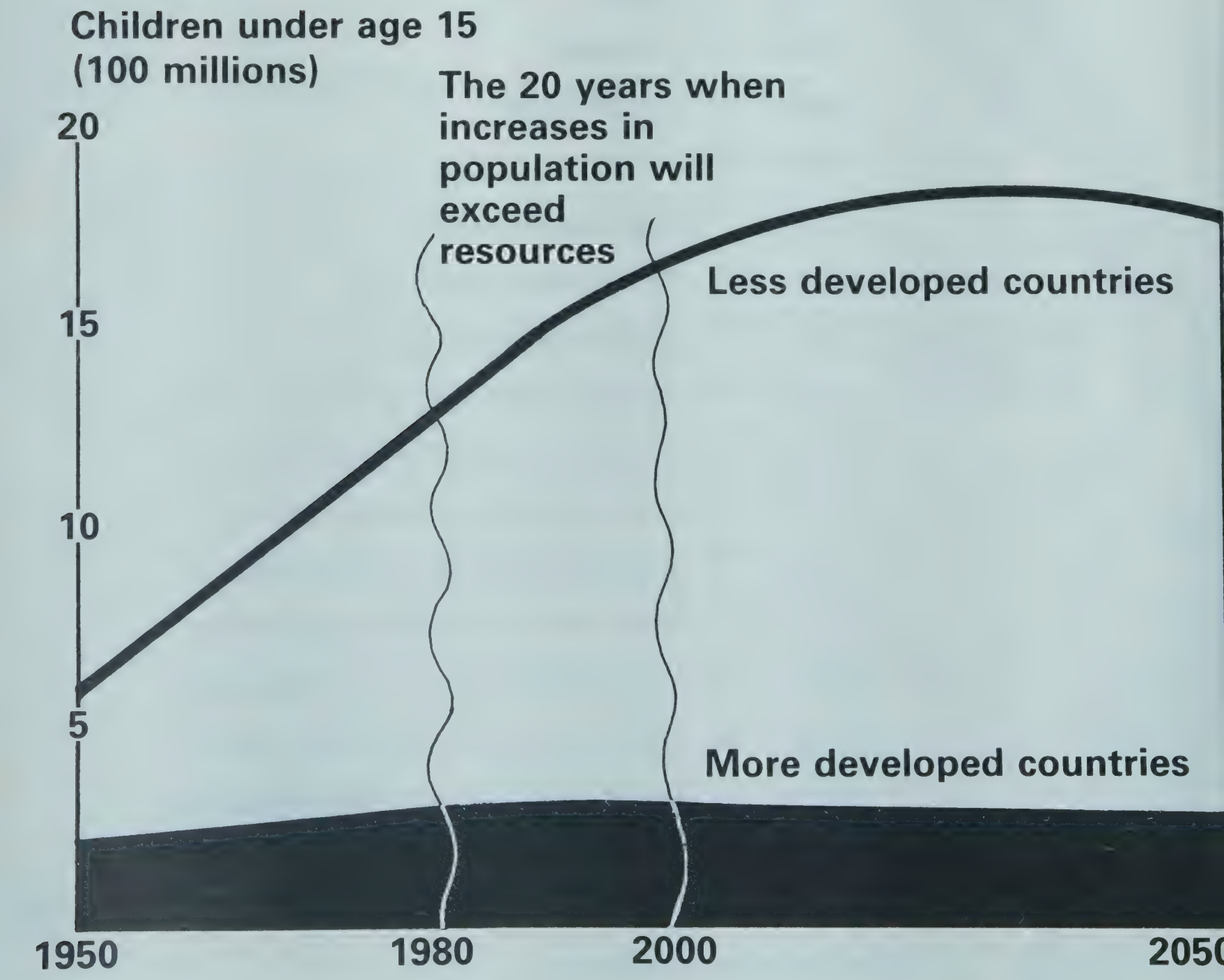


Fig. 2 *World population under the age of 15, 1950–2050. Note the estimated steep rise in these figures from 1950 to 2000 in the less developed countries.* (Source: *UN Population Division estimates and projections.*)



Ethical aspects of family planning

Most religions are agreed that family planning is necessary, good and proper; indeed under certain circumstances there is an obligation to plan the number of children in a family. Roman Catholics agree with the idea of family planning, although they find only certain methods acceptable.

It is important to respect other peoples' consciences: individuals or couples should not be pressed to use a method they find morally offensive. Equally, if the midwife, nurse or doctor feel they cannot advise on a particular method, because of their own views, they should try to make sure the individual or couple get advice from another source.

As in all work in the area of health, compassion, gentleness, patience and wisdom are needed in giving family planning advice. Some people behave in ways that other people might not approve of, but they still deserve care and attention. There is no evidence from any country that the availability of family planning methods makes people immoral or irresponsible. There is evidence that the use of contraceptive methods can reduce some of the harmful effects — especially upon others — of intemperate sexual behaviour. Many people find that if they can discuss their problems frankly and without fear of reproach, the act of talking about the situation may lead to adopting a responsible line of action.

In some countries unmarried girls will seek contraceptive advice. The way their problems are dealt with will depend on local circumstances, but it should be remembered that asking for contraceptive advice shows a wish to behave responsibly on the young girl's part. Such girls should always be treated with sympathy and understanding.

The IPPF

A fundamental human right

All the Member Associations making up the International Planned Parenthood Federation believe it is a fundamental human right for people to receive family planning advice. They believe that people should have the children they want when they want them, bearing in mind their responsibility to the community in which they live and to society as a whole. Advice needs to be available to those who cannot have the children they want as well as to those who may have more children than they can support, or who may wish to space their children for reasons of family health and well-being.

Motivation and counselling

The natural hope of most people is to have children. The number of children they wish to have will be influenced by their cultural and religious upbringing, by their way of life, by the amount of education they have received and by their aspirations and the opportunities open to them.

When existence is harsh with death, disease and malnutrition almost ever-present, pregnancy may seem necessary to compensate for the children who die. In rural farming life children are of great economic value, and represent security in the future for the extended family (Fig. 3). But under the pressures of urban life and the nuclear family, children are expensive and education of fewer children may be seen as a better investment than greater numbers of children. The cost of bringing up children is a factor which influences couples in some societies to have smaller families. However, one of the most effective and long-lasting motives for contraceptive use in industrialized societies is the wish of women to have a career, to obtain higher education and skills, and to have independence and prestige with a higher standard of living.

In societies that are male dominated, the men and their leaders, especially religious leaders, should be the first target of motivation. Conflict concerning family planning may occur if in these societies the women are urged to use family planning methods before the men are in agreement.

Motivation should start with children, the parents of the future. The desired family size can be portrayed in all teaching material. Prestige, prosperity, and health can be shown to be associated with small families; poverty or other problems with large families. It should be stressed that children are more likely to be healthy if births are spaced at two to three year intervals. In this way the concept of the ideal family size is emphasized (Fig. 4).

Although some couples want large families, there are many who would like to have no more than four children. In addition, there are other things they want as well:

They want health and prosperity.
They want their children to be healthy and to survive.
They want their children to be educated, to have success and to be a source of pride to the family.

These hopes are more likely to be achieved if, instead of having a large number of children, they follow four simple guidelines (Figs. 5, 6 & 7):

Four simple guidelines

Mothers should not have their children when they themselves are very young (under 20 years).
Mothers should not have their children when they themselves are too old (over 35 years).
Couples should plan for a limited number of children.
Couples should space the births of their children.

These four points are often summarized as: too young, too old, too many, and too close. All are factors which are bad for the health of mothers and children. It is the role of counselling to explain why these points are important, and to show how family limitation can be made possible using the available contraceptive methods. Counselling should also indicate the benefits to health of these modern contraceptive methods.

Counselling

Counselling can be carried out by a doctor, nurse, midwife or any other trained member of the family planning or health team. But nurses and midwives play an especially important part in discussing family size, as there is much goodwill between them and the women they look after. They often know the women well and their views are respected. As women,* they may be easier to talk to and have more time to spend in discussion. The doctor, whether male or female, is often seen as a more remote figure.

The purpose of counselling is to help an individual make an informed decision of her or his own. It does *not* mean persuading someone to agree with the counsellor's point of view. This is not easy for doctors, nurses and midwives who have been trained to give

*It is recognized that in some countries there are male as well as female nurses. Male nurses could of course counsel women, but should be able to play an especially important role in counselling men. In doing so, they can emphasize the male responsibility in family planning.

Fig. 3 *This shows the work which many children in developing countries do in farming communities from a very early age. The figure against each illustration represents the age at which this occupation begins in the child's life.*

By his 15th birthday a boy, through his work, has repaid the investment his family have made in him

13 Hoeing

12 Working for wages

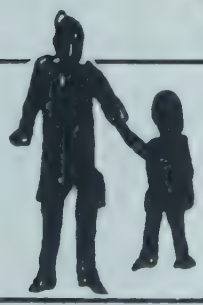
9 Transplanting rice

9 Harvesting rice

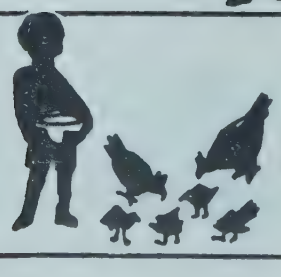
9 Cutting fodder

9 Caring for goats/cattle

8 Fetching water

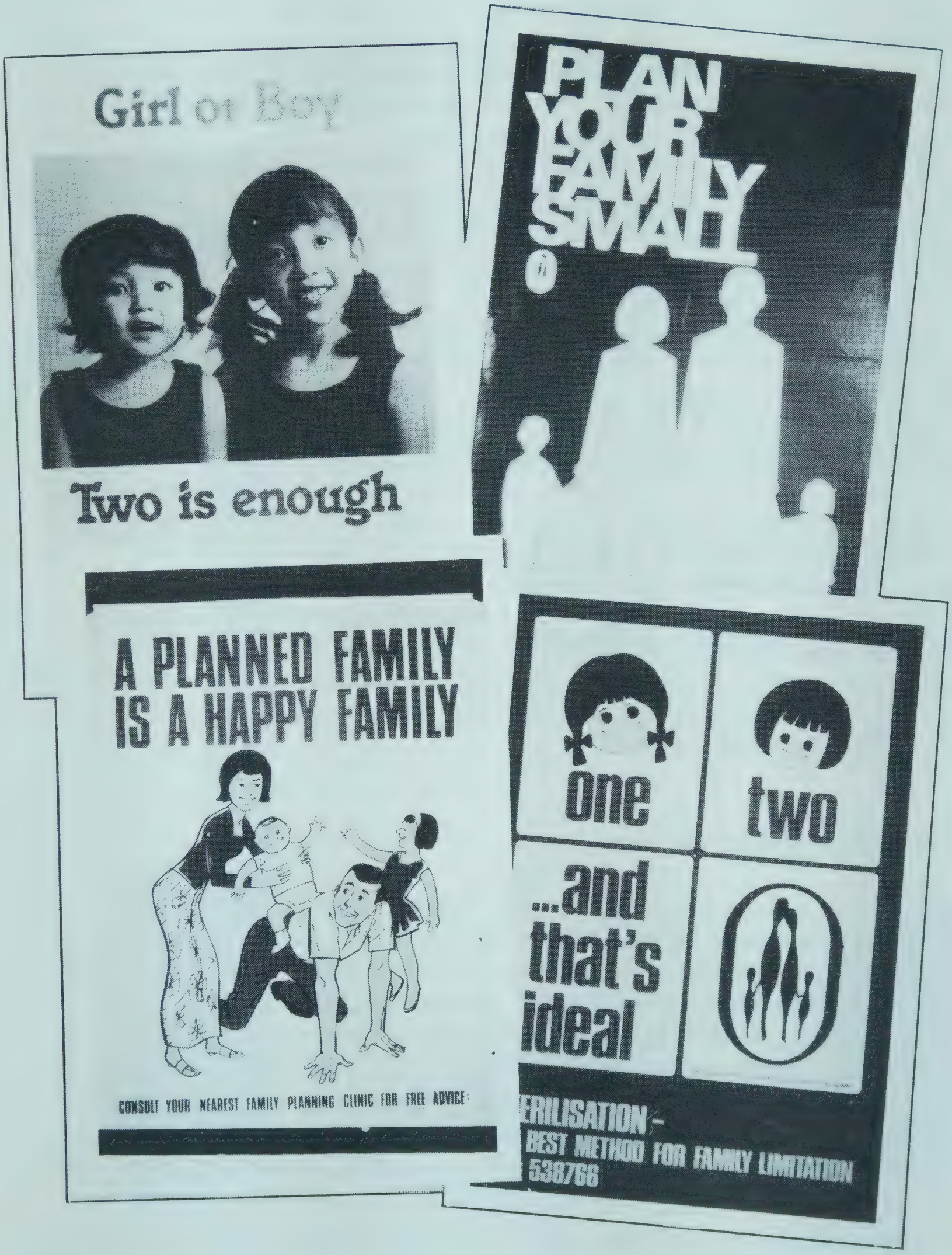


8 Caring for younger children



7 Caring for chickens/ducks

Fig. 4 *Various posters emphasizing the family planning message.*



medical advice and instructions and to see that they are followed.

It is important that couples are given the kind of advice and information in counselling that will enable them to make wise decisions of their own.

Counselling of great importance

Counselling is a two-way process. There is the need to listen to what is said and at the same time take in the background factors of religion, family and culture. Also information should be given and arguments used that are relevant and accurate. In this way the discussion can move to and fro. The final decision of the person being counselled is unlikely to be made immediately.

The counsellor has to overcome her or his own biases and prejudices in order to give impartial information and to avoid moralizing. This is especially difficult where there are differences in culture or religion between the counselled person and the nurse or midwife. But it is even more difficult for those coming from developed countries to developing ones and who are unfamiliar with the varying customs in marriage and sexual life that they will be encountering.

Every opportunity should be taken to make use of the communications media that the public use. Television is a powerful force but of little use if only a small elitist group of people watch it. Newspaper articles and books are only valuable to those who are literate and the language is one they can understand. But as the written word has great influence, every opportunity should be taken to give motivational material to those at schools or colleges and others who are likely to be influenced themselves or to pass on information. It is especially useful to give family planning information to women's groups, adult literacy groups, men's groups, farmers' clubs, and those involved in occupational health.

Training in motivation

Training in motivational skills should become part of the family planning programme for nurses and midwives. There is agreement in most countries and some religions that family size should be planned and even limited, for various health, economic and/or demographic reasons. In approaching a subject as sensitive as family planning the correct approach is important to produce a positive attitude towards contraception by those being counselled.

There are also professional medical aspects to motivation. For those who have a specialist training (and qualifications) in family planning and are carrying out responsible roles, the importance of this work should be reflected in their pay and status. Respect for

Fig. 5 *This shows the increase in infant, toddler and child deaths when the birth interval is* (a) *less than two years (black) and* (b) *two to three years (hatched), compared with an interval of four years or more. (The information in this graph is based on findings in Bangladesh in 1982.)*

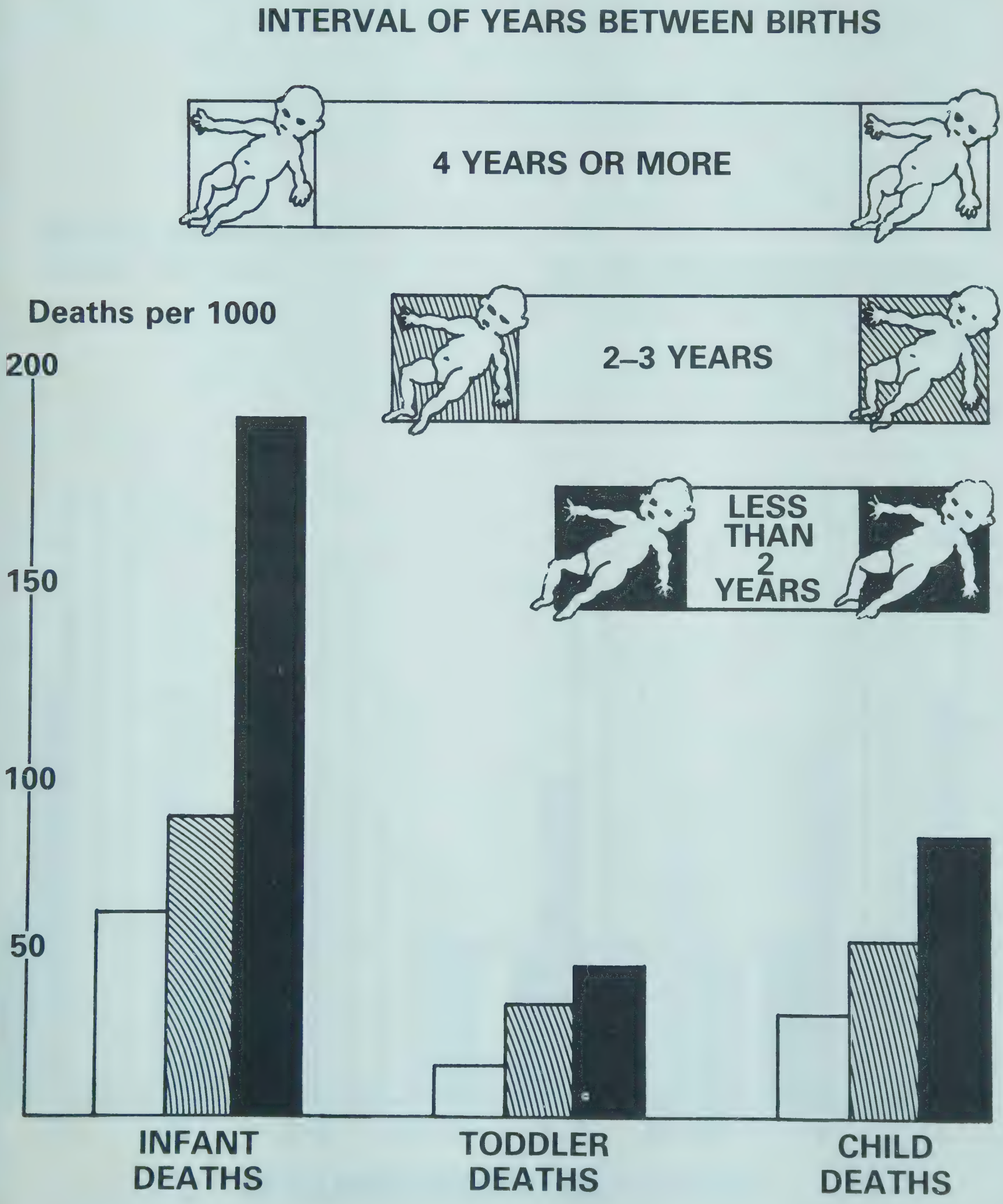


Fig. 6 *This shows the infant mortality rate by parity in three selected countries from the World Fertility Survey. It can be seen that the first birth has a higher infant mortality rate than births 2–3 or 4–6, but the rate rises slowly from the third birth onwards.*

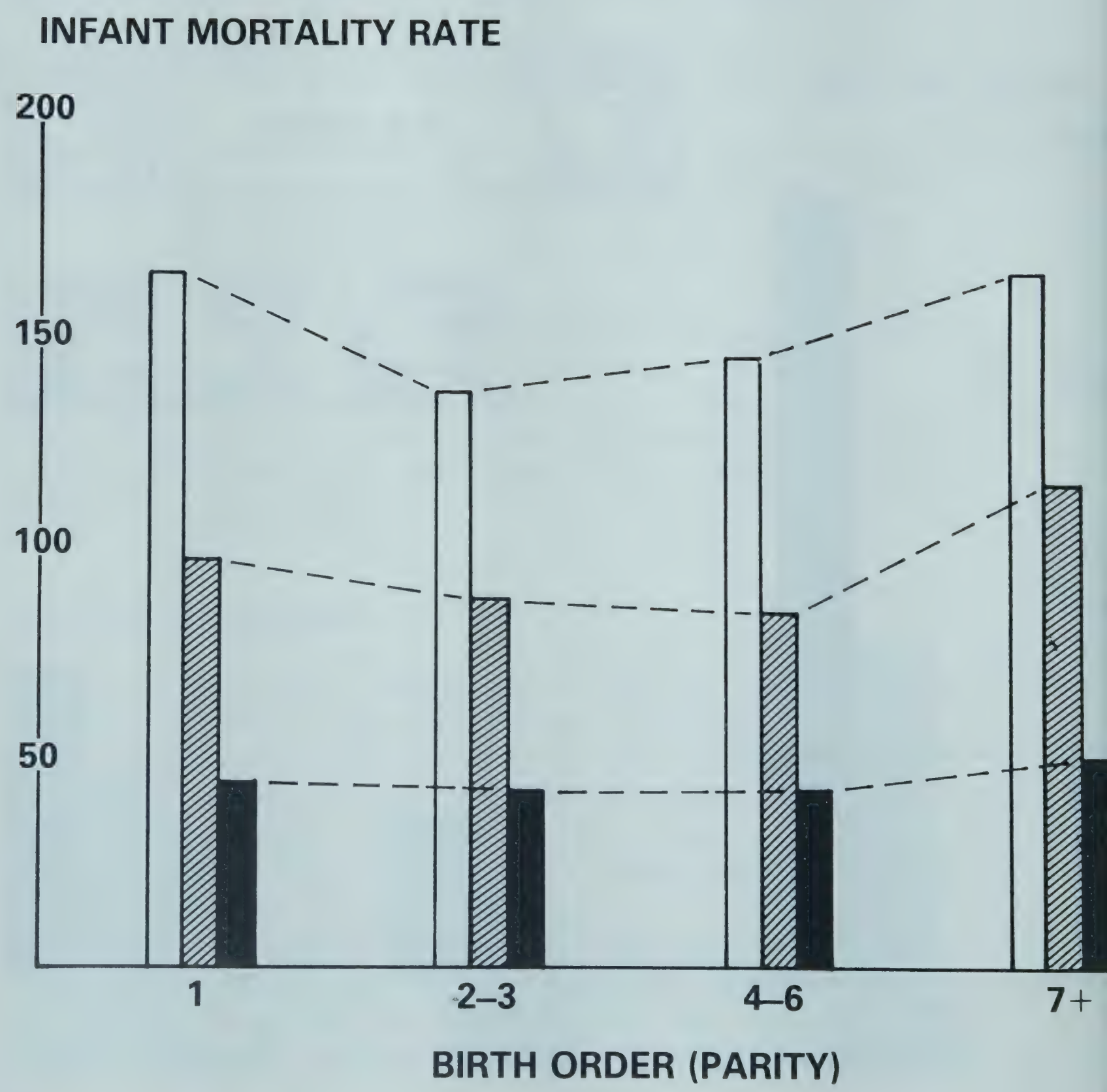
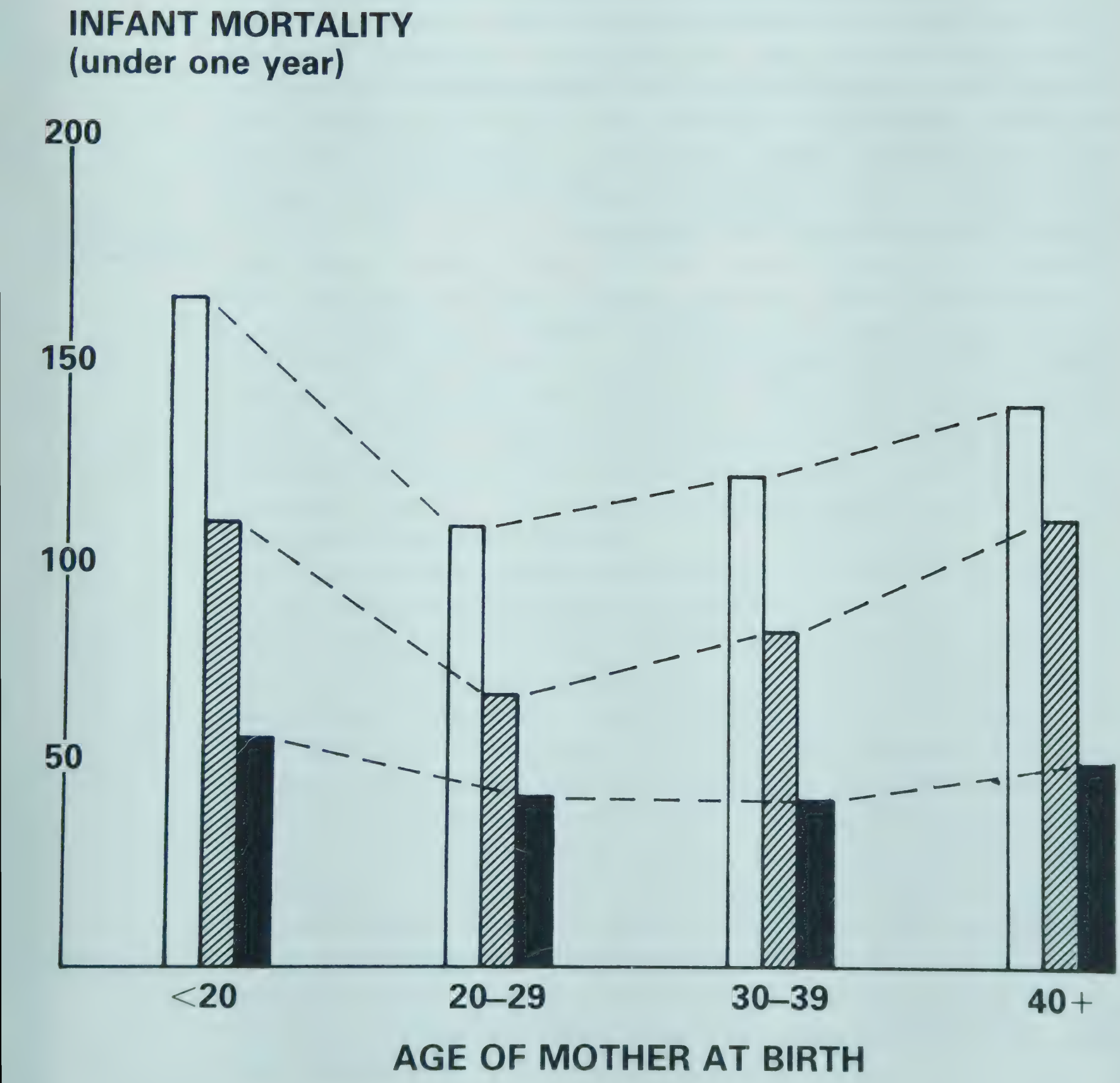


Fig. 7 *This shows infant, toddler and child mortality by the age of the mother at the birth in three selected countries from the World Fertility Survey. It can be seen that the mortality is highest in children born to mothers under the age of 20, and that it rises slowly when the mother has children after the age of 29.*



family planning will diminish if it is not seen to have an important status. The specialist family planning nurse or midwife should appear as an important person in the community, especially as this is a role where the nurse or midwife can take over many of the doctor's responsibilities.

There are professional motivational skills to be learnt. The problems that are likely to arise in interviews and discussions, or problems associated with religious or ethnic differences, are all learnt best in role-playing situations. These enable experience to be gained in how to handle tactfully difficult questions or arguments. They also bring in past experience from the rest of the group of nurses and midwives involved.

In some countries there are strong pressures to limit families to one or two children. One consequence of this is that couples feel that the child or children they have must meet their expectations. They may prefer a male child; they will certainly prefer a child with no physical or mental handicap. As this does not always occur, this situation could be associated with neglect of certain children with a consequent increase in neonatal and infant mortality and in abandonment of female babies and those with handicaps.

Methods of contraception

Many family planning workers have suggested that the ideal contraceptive should have all the following features:

> Complete safety, 100% effectiveness, no side-effects, easy reversibility, low cost or free to user, not under medical control, unrelated to the time of sexual intercourse, and acceptable to users.

Unfortunately, no such contraceptive method has yet been evolved, and it is unlikely that the ideal will be achieved in the foreseeable future.

Present day contraception

In order to help individuals and couples who want to space or limit their families, we have to use what is available today, with the drawbacks which every method has. Some methods are more effective than others. Some are easier to use, some require little motivation by the user, some require very strong motivation, some are female-oriented, some are male-oriented, some are permanent and some are reversible. In many countries, systemic contraception can only be given on a doctor's prescription, in others it can be given by midwives and nurses or else in community-based distribution schemes. In some countries, intrauterine devices (IUDs) can be fitted only by doctors, in others any trained health worker can fit them. Sterilization operations are mostly carried out by qualified medical personnel, but in a few countries, trained nurses, midwives and paramedical personnel do them.

All these methods are described briefly in the tables on the next six pages and in the textual matter that follows. We have not gone into great detail about them, but we hope there is enough information for midwives and nurses to understand basic facts about the methods and much about the part they can play in supplying them or in assisting in their application. Where they can play a most important role is in counselling prospective users of the methods, explaining what they are, how they work, the possible side-effects and how effective each particular method is. It is very useful for prospective users to be able to weigh up for themselves the advantages and disadvantages of different methods and decide which particular one they would like to use. It is also important to realize that one user may change from one method to another during her or his reproductive life, depending on how many children the family already has, their general health, and other factors.

Method and how it works	Effectiveness (pregnancies per 100 users per year) Theoretical	Use
Combined oral contraceptive (page 31) Contains the synthetic hormones, progestagen and oestrogen, prevents ovulation by interfering with the hormonal changes occurring in the menstrual cycle, making cervical mucus thick and impenetrable to sperm, and changing the endometrium.	0	2–4
Progestagen-only Pill (mini-Pill) (page 38) The progestagen acts on the cervical mucus making it difficult for the sperm to enter the uterus and causes the endometrium to become thin. In some cycles it suppresses ovulation.	1	5
Injectable contraceptive (page 38) This contains progestagen and prevents pregnancy by suppressing ovulation in many cycles and changing the cervical mucus to make it inhospitable to sperm and thinning the endometrium. Two common injectables are DMPA (depot medroxyprogesterone acetate) given every three months and NET-EN (norethisterone oenanthate) given every two months.	0.25	3
Implant (page 40) The Norplant subdermal contraceptive implant system consists of six small silicone-rubber capsules containing levonorgestrel. They are inserted subcutaneously in the upper arm by a trained doctor, nurse or other health worker. They are active for about five years, with a steady level of progestagen in the blood stream. They work by preventing ovulation in about 50% of cycles, and cause a thick cervical mucus which stops sperm entering the uterus, and a thin endometrium.	0	1

Advantages	Disadvantages
Highly effective reversible contraceptive if taken correctly. Reduces cancer of the endometrium and the ovary. Reduces iron deficiency anaemia. Regulates irregular menstruation. Reduces some forms of pelvic inflammatory disease, ectopic pregnancies and benign breast tumours. Use unrelated to sexual activity.	Must be taken regularly according to instructions. Women who smoke, especially over the age of 35, may develop serious cardiovascular diseases – heart attacks, strokes and thromboembolism. Possibly less chance of this in developing countries. Hypertension may develop as well. Possible involvement in cervical cancer. Use during lactation will decrease breast milk. Numerous minor side-effects such as breast tenderness, headache, nausea, weight gain or loss. Sometimes increased pigmentation on the face. These often disappear within a few months. In some countries, needs a doctor's prescription.
There are no oestrogenic side-effects. Does not affect lactation. Probably has less cardiovascular side-effects than the combined Pill, so can be used for women over 35 who do not smoke. Use unrelated to sexual activity.	Has to be taken at the same time every day. Not as effective as the combined Pill. Causes menstrual irregularities leading to amenorrhoea. If pregnancy occurs, there is a higher chance of it being ectopic than with the combined Pill. In some countries, has to be prescribed by a doctor.
Extremely effective reversible contraceptive. Needs only two- or three-monthly attendance. Many women prefer injectable medication. No side-effects of oestrogen. Can be administered by trained nurses and midwives. No effect on lactation. Use unrelated to sexual activity.	Causes disruption of the menstrual cycle, often heavier bleeding at first, leading to amenorrhoea in about 50% of users. DMPA may cause weight gain.
Extremely effective reversible method. No serious side-effects yet detected after many years of clinical trials. No continuous medication needed. Return of fertility immediate on removal. Use unrelated to sexual activity.	Menstrual irregularities can occur, sometimes leading to amenorrhoea. Insertion and removal need small surgical procedures by trained personnel. Long-term studies on Norplant are still under way, so it is not yet certain if further side-effects may occur.

Method and how it works	Effectiveness (pregnancies per 100 users per year) Theoretical	Use
Intrauterine device (page 42) A plastic or copper-bearing device is placed in the uterus. Its mode of action is not fully understood. It may prevent the egg being fertilized by the sperm.	1	3
Diaphragm (page 49) A rubber-domed cap with a soft flexible rim. It is used with a spermicide and is inserted in the vagina to cover the cervix to prevent the sperm entering the uterus. The user has to be shown exactly how to fit the diaphragm and must be able to do it herself.	3	15
Spermicides (page 54) These may be in the form of foaming spermicides, creams, jellies, tablets or pessaries. Spermicides are inserted vaginally shortly before sexual intercourse. They inactivate sperm and also prevent sperm entering the uterus.	6	20
Vaginal sponge (page 54) This is a soft round polyurethane sponge about 5 cm (2 inches) in diameter containing a spermicide. Can be inserted up to 24 hours before sexual intercourse, after it has been moistened with water to activate the spermicide. It must cover the cervix. It should be removed no longer than six hours after intercourse and cannot be re-used.	8	25

Advantages	Disadvantages
No motivation needed once the IUD is inserted. Only occasional checks are necessary. Can be left in place for several years or indefinitely, depending on type. Insertion can be carried out by a well-trained health worker. Use unrelated to sexual activity.	Careful insertion needed to avoid undue pain or perforation of the uterus. Unsuitable for women who have not had a pregnancy. Increased bleeding may lead to anaemia, especially in the first few months. Risk of pelvic inflammatory disease. The device may be expelled. If this is not detected and corrected, pregnancy can result. Discontinuation rates fairly high because of side-effects – menstrual problems, pain, infection. Ectopic pregnancies must be thought of if symptoms suggest this. Uterine perforation may occur. Copper-bearing IUDs and closed devices must be removed if they perforate. Infection may occur during pregnancy with the IUD in place.
No serious side-effects. It can be inserted well before sexual activity, although the spermicide used with it needs to be renewed shortly before sexual intercourse. May protect against some sexually transmitted diseases. If used conscientiously, is reasonably effective.	Needs privacy for insertion. Urinary infections are found occasionally with its use. Cultural factors concerning insertion may limit its use in some countries. Some men may object to its presence. It needs checking every few months to see that the rubber has not deteriorated and that its size is still correct for the woman. This applies after a pregnancy or abortion or a weight change of 2.2 kg (5 lb) or more. A few women and men are allergic to rubber or spermicides.
Easy to use. No serious side-effects and no prescription required. May protect against some sexually transmitted diseases.	A high failure rate. A short waiting time is essential between insertion and sexual intercourse and the effect only lasts for a relatively short time. Preparations containing mercury should not be used as they can be toxic. Some men and women complain of messiness or leakage from the vagina. A few women and men are allergic to spermicides.
May be inserted immediately before intercourse or up to 24 hours before. Does not need a prescription and it is relatively easy to learn its insertion.	May cause an allergic reaction at first. Sometimes it is difficult to remove. Rare cases of toxic shock syndrome have been reported with its use. Cultural factors concerning insertion by the woman may limit its use in some countries. The high failure rate should be noted. Its price may be a deterrent, particularly in poorer communities.

Method and how it works	Effectiveness (pregnancies per 100 users per year) Theoretical	Use
Periodic abstinence (page 55) No mechanical device is used here, but the couple have to avoid sexual intercourse during the time the woman may be fertile in the monthly cycle. This could mean that more than half the cycle may be unavailable for sexual intercourse. Three methods are commonly used: the measurement of the basal body temperature, the observation of changes in the cervical mucus, and a combination of the two known as the sympto-thermal method. These all need careful instruction to the user.	3	20
Condom (page 61) This is a thin rubber sheath which covers the erect penis and collects the semen, thus preventing sperm from entering the vagina. It must be rolled on to the penis before any contact with the female genitalia and must be held against the penis after sexual intercourse so that it does not slip off when the penis is removed from the vagina. Each condom can be used only once.	3	6
Withdrawal (page 61) Here the man withdraws his penis from the vagina before he ejaculates during sexual intercourse.	10	10
Female sterilization (page 66) Tubal occlusion is a permanent method of contraception in which the uterine tubes are occluded in various ways to stop the ovum meeting the sperm. The tubes may be closed by tying and cutting or with clips or bands, occasionally by electro-cautery. Three main methods of operation are used: mini-laparotomy, post-partum sterilization, or laparoscopy. These can be carried out under local or general anaesthesia.	0	0.5
Vasectomy (page 67) Vasectomy consists of cutting the vas deferens on both sides in the scrotum. These tubes carry the sperm from the testes. By cutting them, a permanent block on sperm in the semen is produced. The operation can be done under local anaesthesia as an outpatient procedure.	0	0.5

Advantages	Disadvantages
No drugs or appliances needed and the Catholic Church approves of this method. It may bring a couple into closer harmony if they are strongly motivated to use the method.	There is a high failure rate. Strong commitment and motivation are required, with a good deal of training and record-keeping. Cannot be used satisfactorily in irregular cycles. The long phases of sexual abstinence may be a cause of stress.
This is widely available and can be bought over the counter in many places. It gives some protection against sexually transmitted diseases. Gives the man added responsibility in sexual intercourse.	Its use may interrupt foreplay. Some users complain of reduced sensation. In rare cases, the man or woman may be allergic to the rubber. The rubber may deteriorate in hot humid climates.
The method is always available and costs nothing. Well-motivated couples are often very happy with this method.	Requires considerable control by the man. Effectiveness is poor if the sperm are left close to the vagina. Sperm may escape in the vagina before ejaculation. The woman may not reach orgasm before the withdrawal and has no control over the method.
This is a permanent method which requires careful counselling. There are no serious long-term medical side-effects. Only a single procedure is necessary. Does not affect the menstrual cycle or libido.	An operation is required and carefully trained operators are needed. There may be complications at or soon after the operation, including infection and bleeding. Hospital back-up is sometimes necessary. Occasional failures do occur. Rarely, the operation can be reversed, but this requires specialist treatment and does not guarantee a pregnancy.
This is a safe and effective method. Only a single operational procedure is required. No serious long-term effects. Does not affect hormone production or libido.	The man is not sperm-free immediately after the operation but has to wait for at least 12 ejaculations, and then his semen should be tested for the presence of sperm. Occasional failures can occur. Some men are afraid that vasectomy is the same as castration, and careful counselling is essential to avoid this fear. The operation can occasionally be reversed, but without any guarantee of a subsequent pregnancy, and requires specialist treatment.

Female methods

Physiological considerations

At birth each human ovary contains several thousand primordial follicles, each consisting of an egg surrounded by a sphere of cells capable of producing oestrogen and progesterone. A woman begins to release an egg each month from one of her ovaries at the time of, or fairly soon after, her first menstrual cycle. However, it is usual for her to be relatively infertile during the first year, as few fertile eggs are produced. After this slow beginning, ovulation is likely to occur every month, unless she is pregnant or lactating, until she reaches her mid-thirties. Then ovulation becomes less frequent, until by the age of 45 it may take place very infrequently. After the menopause when menstruation stops, there is no further ovulation. This explains why a woman's fertility becomes less as she grows older, and why less effective contraceptive methods may be successful after the age of 35, whereas they would not be so earlier.

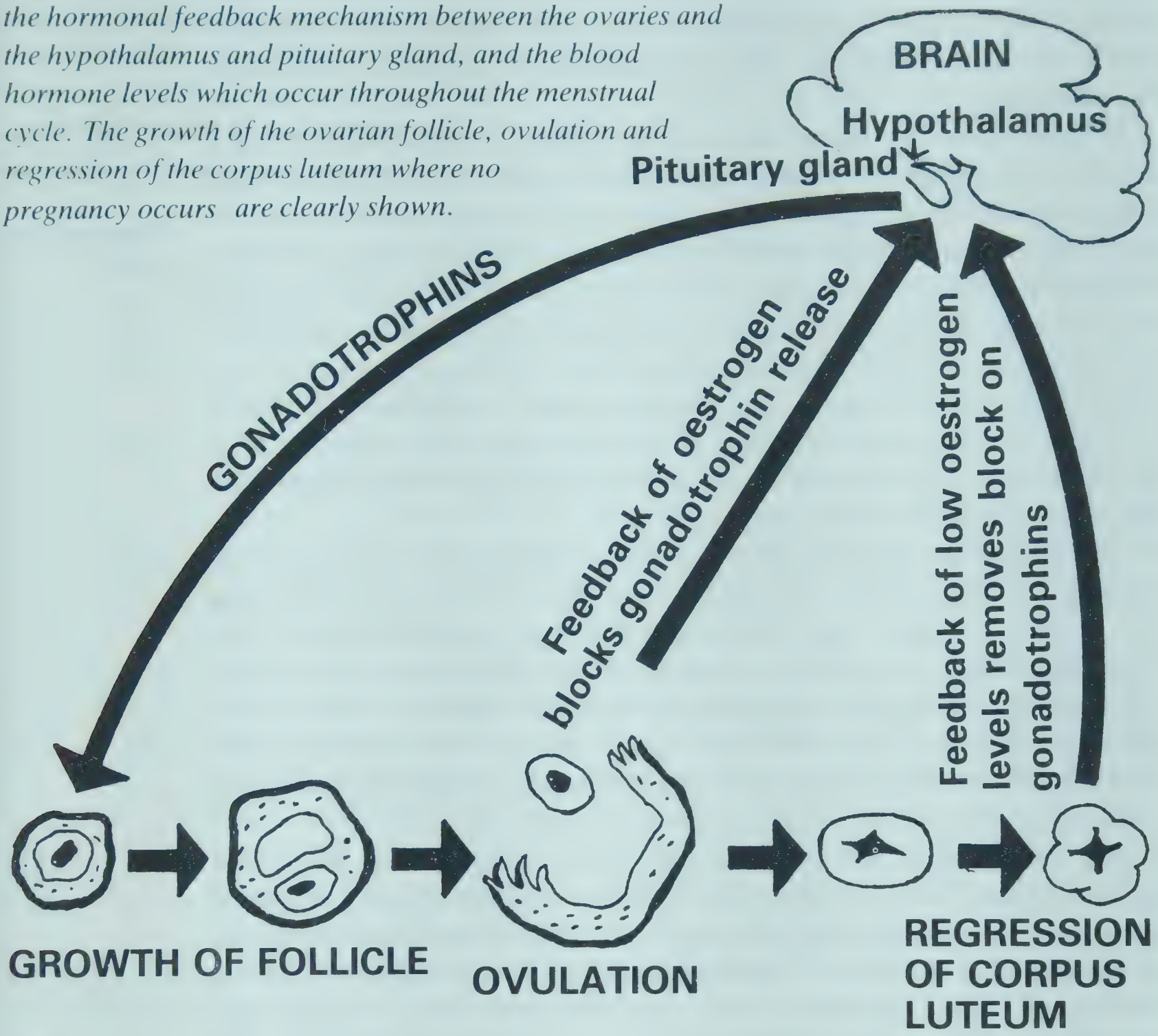
Ovulation is induced by a series of hormonal actions, beginning in the hypothalamus, the lowest part of the brain stem. Here a releasing hormone is produced in response to low levels of oestrogen in the blood. This releasing hormone travels the short distance by special blood vessels to the anterior pituitary gland where it stimulates the production of two hormones, the gonadotrophins.

These are the follicle stimulating hormone (FSH) and the luteinizing hormone (LH). They stimulate a primordial follicle to produce oestrogen and to release its egg in the middle of the monthly cycle. After the egg leaves the follicle, the empty follicle fills with yellow material to become the corpus luteum which produces progesterone in addition to oestrogen (Fig. 8).

Process of ovulation

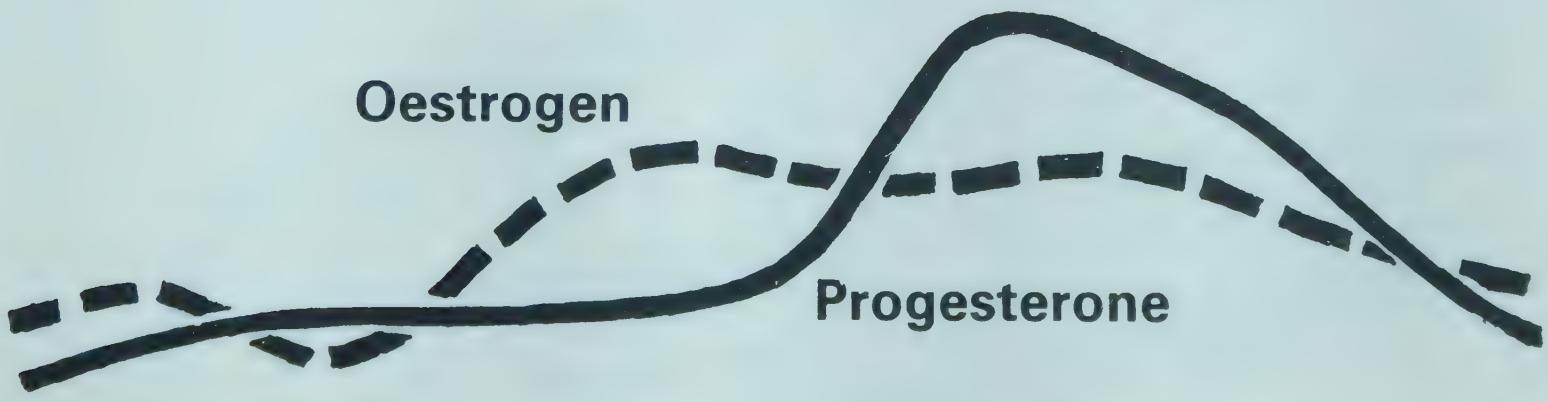
If a pregnancy does not occur, the corpus luteum has a 'life' of only 14 days. If the egg on its way down the uterine (Fallopian) tube is not

Fig. 8 *Diagram of the development of the ovarian follicle, the hormonal feedback mechanism between the ovaries and the hypothalamus and pituitary gland, and the blood hormone levels which occur throughout the menstrual cycle. The growth of the ovarian follicle, ovulation and regression of the corpus luteum where no pregnancy occurs are clearly shown.*



Period								
0	1		2	WEEKS OF CYCLE	3		4	

Hormone levels in blood



fertilized within this time the corpus luteum becomes inactive and finally disappears. If a pregnancy occurs, the corpus luteum remains active for 10-12 weeks, producing hormones to support the developing pregnancy.

If there is no fertilization and implantation, a fall occurs in the amount of oestrogen and progesterone in the blood stream and menstruation starts. This fall is monitored by the hypothalamus and the pituitary gland which react by producing more releasing hormone and more FSH and LH respectively to stimulate the ovary to release another egg and produce further oestrogen and progesterone in the monthly cycle. It is the fall in the blood level of these hormones that makes the hypothalamus and pituitary react, and this is called a negative feed-back mechanism. If the hormone level remains high there are no releasing hormones, and the pituitary does not produce any more gonadotrophins (Fig. 8).

The menstrua cycle

The hypothalamus and pituitary are not able to tell the difference between natural (ovary produced) oestrogen and progesterone and the synthetic forms used for contraception. Consequently, when these hormones are given as a contraceptive, their level in the blood stream remains high and the pituitary does not stimulate the ovaries. There is therefore no ovulation. This explains why combined oral contraceptives are so effective. Only very occasionally does ovulation take place when these contraceptives are used.

The natural steroids, progesterone and oestrogen, also act on the uterine tubes, the body of the uterus and the cervix, to prepare these structures for sperm and egg transport, fertilization and implantation. If the normal pattern of hormone release is altered by synthetic hormones, these processes can be disrupted and a pregnancy prevented. The main action of the progestagen-only Pill, the injectables and subdermal implants is by means of this disruption of the normal physiology, while ovulation is suppressed by all these contraceptives in some cycles, but not all. Probably the main action is on the cervical mucus to make it too thick for the sperm to be able to penetrate it.

Hormonal methods

1. Combined Pills - 'the Pill'
2. Progestagen-only Pills
3. Injectables
4. Implants

These methods stop conception in several different ways. The combined progestagen and oestrogen Pill suppresses ovulation (see page 30) as well as bringing about local antifertility effects in the woman's reproductive system. Progestagen itself alters the mucus in the cervix and makes it thick so that the sperm cannot penetrate it. Some changes also take place in the endometrium lining the uterus. These are the main ways in which progestagen-only Pills, injectables and implants act, since they all contain only progestagen. In addition they may suppress ovulation some of the time, which is why they give rise to menstrual irregularities.

Combined Pills

Combined Pills contain oestrogen and progestagen and are taken for 21 days each month. The remaining seven days without Pills include the days when bleeding will usually occur. Some brands of Pills have placebo or iron tablets added for these seven days so that a woman will take one Pill a day for the whole month.

The Pills are supplied in monthly packs (Fig. 9). Different brands have different combinations of oestrogen and progestagen, and the present recommendation is that a woman should be given the lowest dose of oestrogen (50 μg or less) and progestagen that suits her. In a fairly new development, biphasic and triphasic Pills are being marketed. These mimic the normal hormone levels that occur through the menstrual cycle, with amounts of oestrogen and progestagen changing once or twice during the cycle.

It is important for nurses and midwives to be acquainted with the way the doses of oestrogen and progestagen are written on the packets of Pills so that they can be sure of the dose and whether the packets contain iron tablets as well. The name of the Pill may not help, as the name given to a preparation in one country may not apply in another.

Fig. 9 *Various packs of oral contraceptives.*

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When a woman begins to take the Pill, she should start on the first day of her menstrual period, in which case she will be protected right away, but will have a short first cycle. Sometimes older instructions to start the Pill on the fifth day of the cycle are still to be found, but the first-day method is becoming widely recommended. She should take one Pill each day until the contraceptive Pills are finished. The bleeding she will notice during the Pill-free days is not normal menstruation, but is bleeding caused by hormone withdrawal.

How to take the Pill

If irregular bleeding occurs while she is taking the Pills, she should continue to take them in the usual way. If this 'breakthrough' bleeding continues in further cycles it is an indication to change to a Pill with a slightly higher dose of oestrogen or progestagen.

Some women do not bleed during the Pill-free week. This has no harmful effect and may even be looked on as an advantage. The nurse or midwife, however, should always be aware that absent withdrawal bleeding may mean pregnancy. However, one missed period does not necessarily mean the woman is pregnant, since amenorrhoea is not uncommon with the Pill. If there are other signs or symptoms of pregnancy, the nurse or midwife should carry out a pregnancy diagnostic test, if possible, or a vaginal examination to determine the size of the uterus. Although the Pill method is highly effective, women can sometimes become confused about their Pills or forget them and so become pregnant.

Non-contraceptive health benefits of oral contraceptives

The Pill has now been in use for some 25 years. More than 70 million women around the world have used oral contraceptives for the prevention of pregnancy. Large epidemiological studies can be undertaken when the population using oral contraceptives is of this size. These studies, carried out among women in developed countries, have set out the health risks associated with oral contraceptive use. More recent evidence from these large-scale studies has shown substantial non-contraceptive health benefits from oral contraceptive use. These benefits have been less publicized than the health risks that do occur.

The Pill's heal benefits

There are five diseases or conditions in which the Pill's protective effects are well documented.

The most constantly demonstrated benefit of oral contraceptive use is a reduction among Pill users in the incidence of benign breast disease, including both fibrocystic and fibro-adenomatous conditions. The incidence of such conditions decreases the longer oral contraceptives are used. The risk of disease falls when the dose of progestagen increases while the oestrogen dose is held constant.

Another well-documented non-contraceptive benefit of oral contraceptive use is a reduction in the incidence of retention cysts of the ovary.

Iron-deficiency anaemia, especially prevalent in developing countries, is known to be less in Pill users than in non-users. This is due to the reduced menstrual flow (actually withdrawal bleeding) experienced by oral contraceptive users.

Oral contraceptives have also been shown to be protective against the development of pelvic inflammatory disease (PID). One important aspect of this finding is its particular relevance to developed countries where PID has almost reached epidemic proportions. It is true to say that developing countries are also showing an increase in the incidence of PID, but until better diagnostic facilities are available we will be unsure of the exact amount of PID in these countries. PID can give rise to infertility and/or ectopic pregnancy. Ectopic pregnancy is a life-threatening surgical emergency, while infertility can have psychological and other effects on the woman and her partner. Lowering the incidence of ectopic pregnancies by the use of the Pill is a major health benefit of oral contraceptive use.

Three additional diseases may be prevented or their incidence lowered by the use of oral contraceptives. The additional diseases are ovarian and endometrial cancer and rheumatoid arthritis. Oral contraceptives have also been shown to reduce the incidence of menstruation-related disorders such as irregular bleeding, painful menstruation, excessive bleeding and pre-menstrual tension.

Thus it is clear that Pill users derive not only the expected benefit of very good contraceptive protection, but also some major non-contraceptive health benefits.

Unwanted side-effects of the Pill

Cardiovascular conditions

Cardiovascular conditions: These are the main and sometimes serious side-effects associated with use of the Pill. There is a small but known risk of cardiovascular disease (heart attacks, stroke or thromboembolism), largely limited to women who smoke or who are over 35 years old. In developing countries, these risks are smaller than in developed countries. For example, puerperal deep-vein thrombosis is rare in developing countries, while it is common in the UK and USA. This is partly because the diet in developing countries is generally low in animal protein and animal fat and also because women there are unlikely to smoke cigarettes. In weighing up the benefits or risks of taking the Pill, the local maternal mortality has to be borne in mind. Whatever very small risk may be associated with the Pill, this is far

less than the dramatically high rate of maternal mortality in developing countries, particularly among high-parity women. In many of these countries, the risk of dying in pregnancy is at least 100 times greater than in developed countries.

Blood pressure can be affected by the hormones of the Pill. Where a blood pressure test can be carried out, the blood pressure should be checked periodically, but if this is not possible the benefits of Pill use still outweigh any hypertensive risk.

Liver disease: Where there is active disease of the liver, the Pill should be avoided. But a history of past infectious hepatitis is not a contraindication provided liver function has returned to normal, nor is the enlarged liver seen in chronic malaria. The risk of gall-bladder disease is slightly increased during the first year of use, but not afterwards.

Subjective complaints such as headache, lassitude, depression, or loss of libido are difficult to assess. They are sometimes expressions of anxiety and concern over taking the Pill or of using any contraceptive method. Alternatively they may be true side-effects caused by the Pill. In either case they should be listened to with care. If the symptoms persist and are not diminished by a change in the Pill formulation, the method may need to be changed or the woman referred to a doctor.

Subjective side-effects

The Pill and cancer

Ovarian and endometrial cancer: Ovarian cancer has a high mortality and is sometimes difficult to diagnose before it is inoperable. Endometrial cancer is also a serious disease. There is now strong evidence that the Pill *reduces the risk* of these cancers by about half, and the effect can continue for 5-10 years after the Pill is stopped.

Cancer of the cervix: There have been a small number of reports (from the UK and from a WHO study in developing countries) of a possible association between combined Pill use and pre-malignant conditions of the cervix. The risk, if this evidence is correct, is small and where cervical smears can be taken it is considerably reduced. However, cervical cytology services are not widely available in developing countries. Other factors in the aetiology of cervical cancer have to be borne in mind, particularly an early start to sexual activity and the number of sexual partners of either the woman or her partner. This applies whether the woman has taken the Pill or not. The presently used low-dose Pills are believed not to carry a high risk of involvement in the causes of cervical cancer.

The Pill and cervical cance

Cancer of the breast: There have also been reports (from the UK and the USA) of a possible association between use of the Pill by young women and breast cancer. However, large, well-conducted scientific studies find no such association regardless of the type of Pill used. The well-known predisposing factors have to be remembered, such as a family history of breast cancer in mother or sisters, and a late age at first pregnancy or having no pregnancy at all. The younger the age at first pregnancy, the less the risk. Women who delay their first pregnancy by any means, including the Pill, may increase the risk of breast cancer.

The Pill and breast feeding

There may be a slight reduction in breast milk when a lactating woman is taking the combined Pill. Although many women take the Pill successfully when lactation is fully established, it is wise to avoid the Pill at the time when lactation is being established (for about four months). This is especially important in countries where a baby is totally dependent on breast milk. Mothers should thus avoid the combined Pill during the early months of lactation, though the progestagen-only Pill can be used if suckling is not frequent enough to prevent ovulation (see page 60).

When Pills are missed

Missed Pills

If a combined Pill has been forgotten for less than 24 hours it should be taken as soon as it is remembered or with the next Pill which is taken at its normal time. Irregularity can result in breakthrough bleeding and possible ovulation, with the danger of an unwanted pregnancy.

If two combined Pills have been forgotten (or if there has been severe diarrhoea and vomiting) additional contraception should be used for the following 14 days. At the end of the packet pregnancy should be assumed if bleeding does not occur.

Changing Pills

When changing Pills from one combined Pill to another, the new Pill should be started the day after the last of the previous Pills; there should be no break. This also applies when changing from a combined Pill to a progestagen-only Pill.

Drug reactions with oral contraceptives

Certain drugs that the woman may be using for medication sometimes react with oral contraceptives. Among these particularly are antibiotics, with special emphasis on rifampicin which is used in the treatment of tuberculosis, and anti-convulsant drugs. All these

tend to reduce the effect of oral contraceptive steroids when they interact. On the other hand, high doses of vitamin C tend to increase the effect of oral contraceptives. Again, there have been some reports that oral contraceptives can interfere with the use of other drugs which are used to treat certain illnesses. Therefore, women who are being treated for other conditions should be referred to a doctor if possible to make sure that their treatment does not interfere with the Pills they are using and also that their Pills do not interfere with any other medication they may be taking.

Distribution and supervision of oral contraceptives

Distributing the Pill

Many doctors feel their role is to deal with women who have problems on the Pill and that the initial prescription and supervision should be the responsibility of the family planning nurse or midwife, including blood pressure readings and pelvic examinations (where necessary and/or acceptable). Distribtuion of the Pill could be by whoever normally meets the health needs of the community — doctor, nurse, traditional midwife, pharmacist, or storekeeper. At all times women need kind and informed advice from a trained person. Knowledge of the Pill and how it works is an essential part of nurse and midwife skills throughout the world.

Checklist for suitability for taking the Pill

Health checkl

It is useful for midwives and nurses as well as for people in the community who may be distributing the Pill to refer to a checklist covering the history and examination of the woman before she is given oral contraception. A typical checklist has been adapted from one approved by the Sri Lankan Health Ministry, and reads as follows:

History:

Ask if the woman has had a history of any of the following:

Yellow skin or yellow eyes.
Lump in the breast.
Discharge from the nipple.
Excessive menstrual periods.
Increased frequency of menstrual periods.
Bleeding after sexual intercourse.
Swelling or severe pains in the legs.
Severe chest pains.
Unusual shortness of breath after exertion.
Severe headaches.

Examination:

Yellow skin and yellow eye colour.
Lump in the breast.
Nipple discharge.
Varicose veins.
High blood pressure (Yes = above 150 systolic).
Fast pulse (Yes = above 100).
Sugar in urine.
Protein in urine.
(Some other lists include 'obesity' in the examination.)

Instructions:

If all the above are answered in the negative, the woman may receive oral contraceptives. If any of the above are answered in the positive, the woman must be seen by a doctor before oral contraceptives may be prescribed.

Post-coital contraception

This is a suitable place to discuss the question of post-coital contraception, sometimes known as the 'morning-after Pill'. This is a somewhat misleading term, because contraception can be administered later than the morning after unprotected sexual intercourse, and IUDs can be used, not only hormonal contraceptives.

Women exposed to a single unexpected and unprotected act of intercourse, or whose partner's condom may have burst immediately after ejaculation, can be given emergency contraceptive protection if they ask for it in time.

If they are seen not later than 72 hours after the act of intercourse, they can be given two tablets of a combined oral contraceptive containing 0.25 mg of levonorgestrel and 50 μg of ethinyl oestradiol, followed by two more tablets 12 hours later. If the woman vomits soon after this dose, give an anti-emetic such as metoclopramide (Maxolon) and repeat the dose. Instead of this, they can be given a five-day course of diethylstilboestrol, but this has quite severe side-effects of nausea and vomiting. On this course regular anti-emetic treatment may be necessary.

Up to five days after unprotected intercourse a copper-bearing IUD can be inserted to give protection against pregnancy. All the contra-indications against IUDs apply here, with special emphasis on the disadvantages of fitting an IUD in a nulliparous woman.

All women given post-coital contraception should be asked to return in a month's time to look into the possibility of pregnancy

having occurred. Either then or at the first visit the question of continuing use of adequate contraception should be discussed. Of course if an IUD is fitted that may well remain as the woman's contraceptive.

Many women do not know about post-coital contraception. Midwives and nurses are in a specially good position to let women in the community know that in an emergency they can be helped in this way. Where Pills can be distributed by midwives and nurses it would be useful for them to have a supply of the correct Pills for post-coital use so that if they are approached in an emergency they can immediately help the woman concerned.

Treating unprotected intercourse

It must be emphasized that the treatment outlined above is meant only for emergencies such as burst condoms and of course for such catastrophes as rape. It is not meant to be used after regular if intermittent sexual intercourse.

Progestagen-only Pills

These contain a low dose of progestagen and do not contain oestrogen. They are started on the first day of the menstrual cycle, but an additional contraceptive will be needed for the first 14 days of the first cycle of use. This type of Pill is taken every day without a break, preferably at the same time each day. The best time is usually early evening, as the contraceptive effect is at its greatest about four hours after the Pill is taken.

Some bleeding may occur irregularly each month, but there may also be amenorrhoea. The possibility of pregnancy has to be remembered, especially if Pills are forgotten, or the woman has been vomiting. Progestagen-only Pills may not suppress ovulation, and in young women there is a small failure rate, but as women get older pregnancy becomes less likely. These Pills do not affect lactation and are a valuable contraceptive method during breast feeding. If a Pill is forgotten or the woman is vomiting, additional contraceptive methods should be used for the next 14 days. As with combined Pills (see page 35) there may be adverse reactions between progestagen-only Pills and other medicinal drugs.

Injectables

There are two main products available: Depo-Provera (DMPA) and Noristerat (Net-En). Both contain a large amount of progestagen which makes the cervical mucus impermeable to sperm and also, for much of the time, suppresses ovulation. They contain no oestrogen. Both can be injected deep into the gluteal muscle (upper and outer

quadrant) and both injections are almost painless. DMPA can also be given into the deltoid muscle of the upper arm. DMPA is in an aqueous suspension which is easy to draw up. The dose is 150 mg every three months. Net-En is in an oily solution and requires a wide-bore needle both to draw up and to inject. This is easier when the solution is warm. The dose is 200 mg every two months. After the first three injections a once-in-three-months regime can be used.

The main side-effect of both injectables is menstrual disturbance with irregular bleeding at first and amenorrhoea later. They may cause water retention which occasionally gives tender breasts or abdominal bloating. DMPA may cause rapid weight gain, and if this is marked the injection should not be repeated. With both injections there is some delay in the return of ovulation when the injection is stopped. This is more marked in some women than in others and occurs more frequently after DMPA than after Net-En. DMPA should probably not be given to a woman who is likely to want a pregnancy in the near future.

A useful approximate guide when deciding between the two injections is to think of DMPA as stronger than Net-En, lasting longer, producing more irregular bleeding at first and more amenorrhoea later, and taking longer to wear off and for ovulation to return. Its great advantage is that it requires only four injections a year. In some countries, injectables are given to older women whose families are complete and who do not want to be sterilized.

When the injection is started it can be given on any of the first five days of menstrual bleeding. Positive diagnostic steps, including vaginal examination, if necessary, should be taken before giving the injection if there is any suspicion that the woman is pregnant. As women are sometimes inaccurate in reporting their menstruation it is wise to insist on seeing evidence of bleeding on the day the first injection is given. After childbirth it should not be given for at least six weeks, as it may produce heavy bleeding. This may be confused with bleeding from retained products of the pregnancy, e.g. placental remains. Following the first injection, doses are given strictly at intervals of two or three months, irrespective of bleeding. A woman can change to the Pill at the end of the two- or three-month interval, or change to the injection when on the Pill with no interruption, as both methods suppress ovulation.

This is not a doctor-dependent method and is very suitable for midwives or nurses to give either in a clinic or at the time of home visits, especially in rural areas. When women feel that by being given an injectable method they are being cared for and looked after, they are more likely to accept the menstrual disturbance, but in situations where injectables have been used apparently uncaringly and without

explanation or agreement they have produced strongly hostile feelings. The attitude of the midwife or nurse is all-important.

Injectable contraception is available in about 80 developed and developing countries. DMPA was used in the past as a contraceptive in the USA and is still used there as a form of treatment for endometrial cancer. However, it is still under review by the US Food and Drug Administration as a form of contraception for general use in the USA.

Implants

A new way of delivering hormonal contraceptives to the woman is now being used in addition to the methods just mentioned. This involves the use of implants of a progestagen under the skin. The system that has been developed is called Norplant and is the product of research by the Population Council.

The progestagen levonorgestrel is contained in six small silicone-rubber tubes, each containing 36 mg of the hormone, and each having a diameter of 2.4 mm and a length of 3.4 cm. These tubes or capsules are inserted under the skin, usually in the upper arm, through a small incision. Only a local anaesthetic is needed for the insertion. Once the tubes are in place, the progestagen is released at a steady rate, giving a constant low level in the blood stream, and the contraceptive effect lasts for five years. However, if for any reason, such as wanting to become pregnant, the woman asks for the capsules to be removed, this can be done at any stage during this time and she will immediately lose the contraceptive cover.

Inserting implants

Norplant can be used for most women in the reproductive age group, but is normally recommended for women who want long-term protection from pregnancy, and for those who may not want to be sterilized since they may desire another child in the future. Norplant is especially suited to women who should not take oestrogen and who cannot use or prefer not to use IUDs or oral or injectable contraceptives.

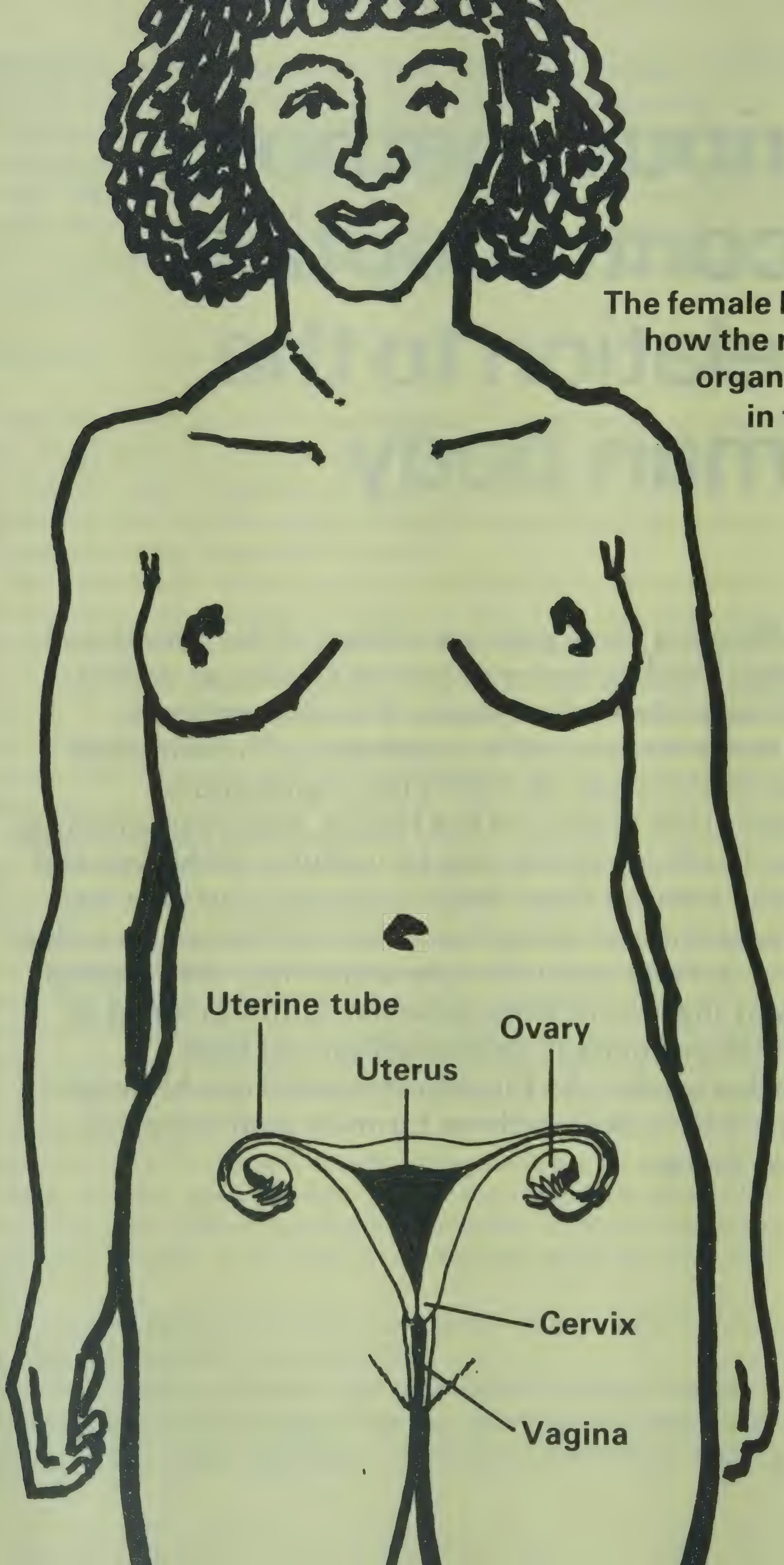
At the end of five years, the implants can easily be removed by making another small incision in the skin, although removal is sometimes more time-consuming than insertion. If further use of the implants is wanted, a new set can be inserted under the skin once again.

The levonorgestrel in Norplant acts as all progestagens do when used for contraception (see page 30).

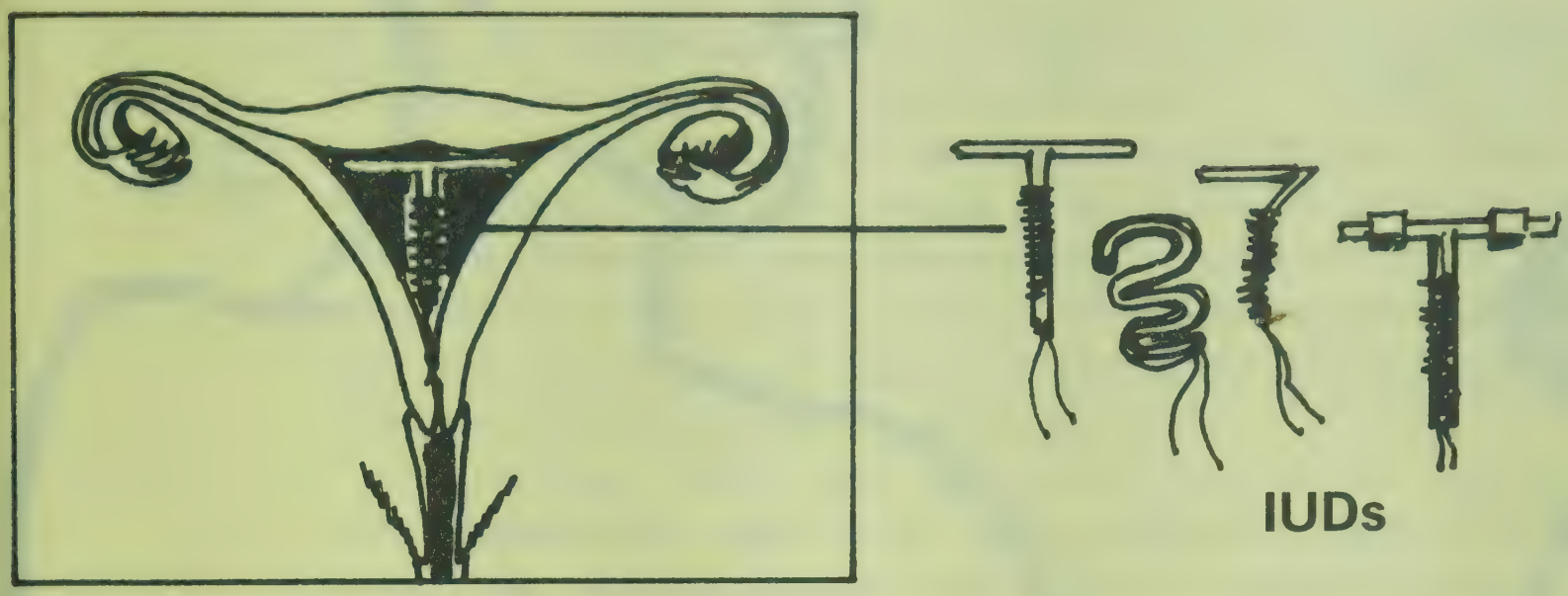
Doctors, nurses, midwives and other health workers can easily insert and remove the Norplant capsules, provided they have special training in the proper technique. There are a number of training

Various methods of contraception in relation to the human body

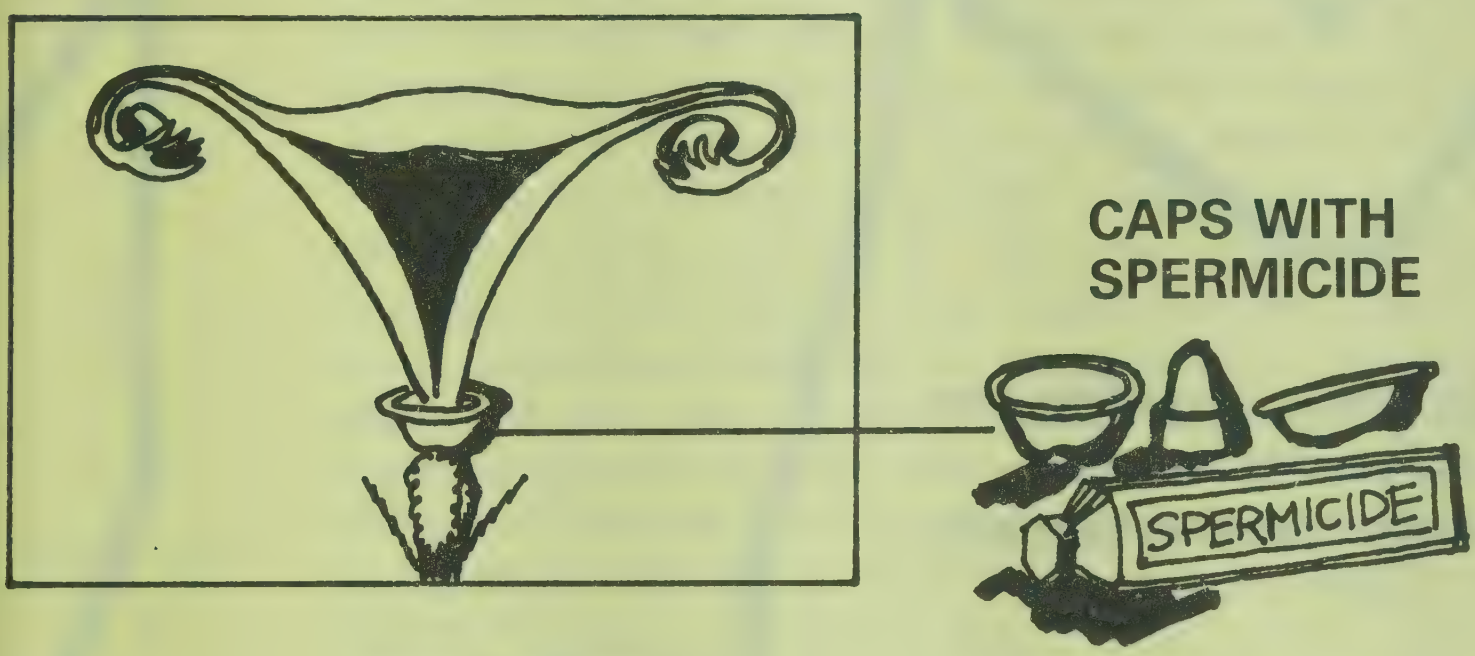
On the following three pages are views of the female and male body showing the reproductive organs, as well as illustrations of the various forms of contraception in relation to the female and the male body. These include occlusion of the tubes, an IUD in the uterus and a diaphragm in the vagina for the female, and a vasectomy in the male. The illustrations may be useful to midwives and nurses who want to show them to women and men who are interested in contraception, but do not have a very clear idea about it. They may not understand their own genital anatomy or the relationship between common forms of reversible or permanent contraception and their reproductive organs. So this centre-spread can be shown to such people to explain these forms of contraception visually to them.



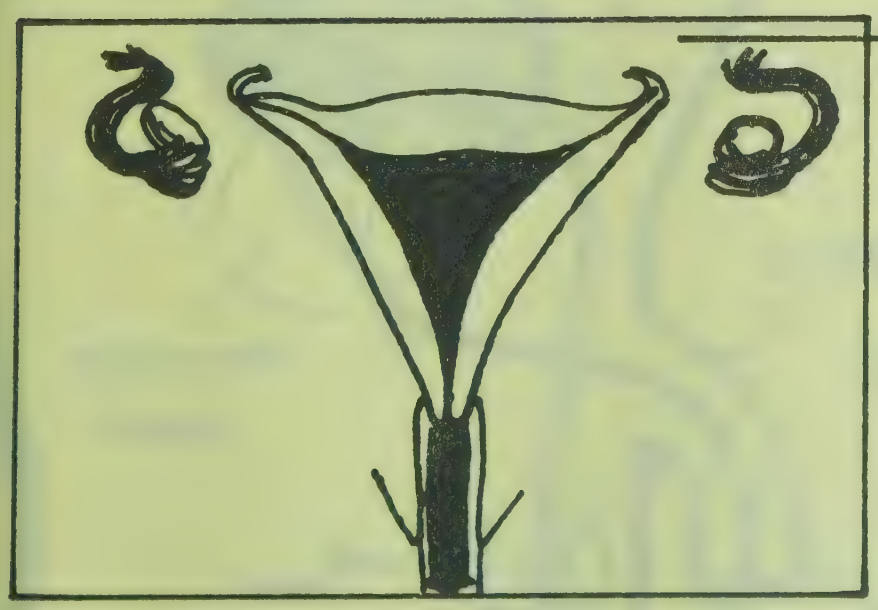
The female body showi
how the reproductive
organs lie
in the pelvis.



IUDs



CAPS WITH SPERMICIDE

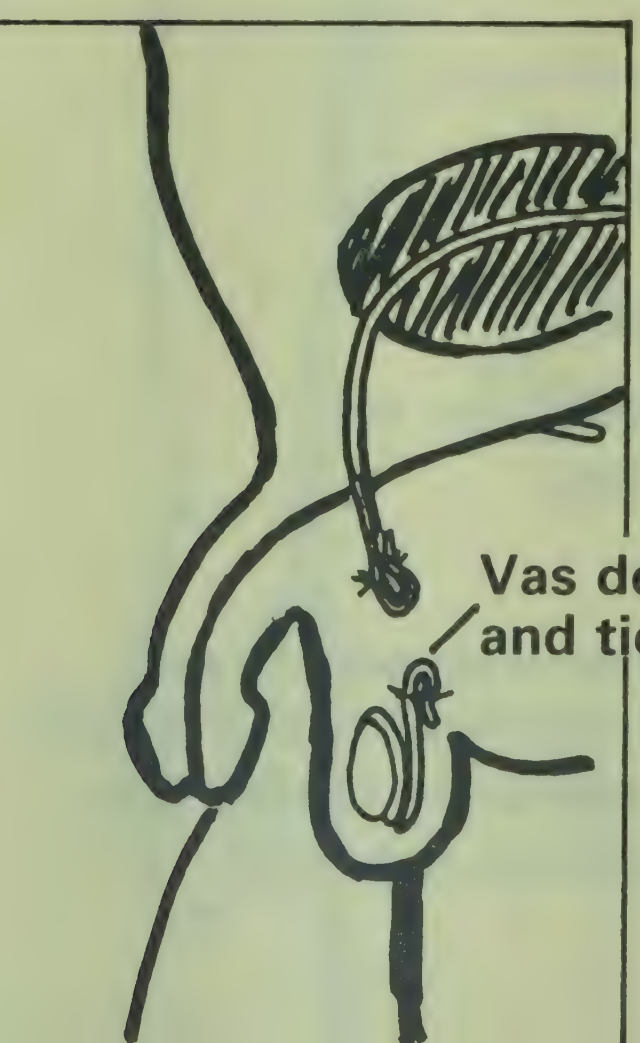


STERILIZATION

Uterine tube cut and tied

Methods of reversible and permanent contraception and their relation to the female reproductive organs.

The male body showing the reproductive organs and where vasectomy is carried out.



Vas deferens
Bladder
Penis
Prostate gland
Urethra
Testes

Training in counselling important

centres in various parts of the world, organized by the Population Council. Training is also given in the correct counselling of women who use Norplant. This counselling should include information on how Norplant works, the length of protection it provides, the fact that it is completely reversible and can be removed at any time, the possible side-effects that may occur, how it is inserted and removed, and the advantages and disadvantages of the method compared to those of other contraceptive methods.

Counselling should also cover the care of the insertion site immediately after insertion and any problems that may arise with the use of the method. Because insertion and removal require a minor surgical procedure, this needs to be carried out under aseptic conditions.

The main side-effect of Norplant as with other progestagen-only methods is some change in the menstrual pattern. There may be irregularity of menstrual bleeding, especially during the first year of use. Intermenstrual spotting sometimes occurs and there may be amenorrhoea. Heavy bleeding very seldom happens, and there does not appear to be an increase in the total amount of blood lost. As time goes on, bleeding irregularities seem to decrease. Provided the women using the method are correctly counselled about bleeding changes, they are usually quite happy with Norplant. If symptoms occur suggesting pregnancy in the presence of amenorrhoea, it is important that steps should be taken to make sure whether the woman is pregnant or not. If she is found to be pregnant the implant should be removed. If a pregnancy is suspected, the possibility of it being ectopic should always be borne in mind. However, the failure rate of Norplant is extremely low.

Other forms of implants are being developed. The Population Council is looking into the use of a two-capsule implant system instead of the six-capsule system as at present, and the World Health Organization and the USA National Institutes of Health are developing a single capsule which would be effective for 18 months and would be absorbed into the tissues (biodegradable) at that time.

Intrauterine devices

These devices are made of plastic or metal or a combination of both. Most of them need to be able to be straightened into a linear form so that they can be inserted through the cervical canal into the uterine cavity, where they resume their original shape.The exact mechanism of action as well as the exact nature of the changes in the endometrium caused by the IUD are not completely understood.

A great variety of IUDs have been invented, but in developing countries the range is usually limited by the types supplied by the Government or the FPA. Inert devices can be supplied loose in bulk, but have to be sterilized immediately before use. Copper-bearing IUDs are usually pre-sterilized in individual packets. They are more expensive than loose IUDs and will lose their sterility if their packaging is broken.

Types of devices

One method of classifying IUDs is into inert and bioactive (usually copper-bearing) types (Fig. 10). The inert devices are usually of plastic (Lippes loop) or stainless steel. The bioactive devices are generally smaller and are of plastic with copper in or around them, or they may contain progesterone (e.g. Copper 7, Copper T, Progestasert).

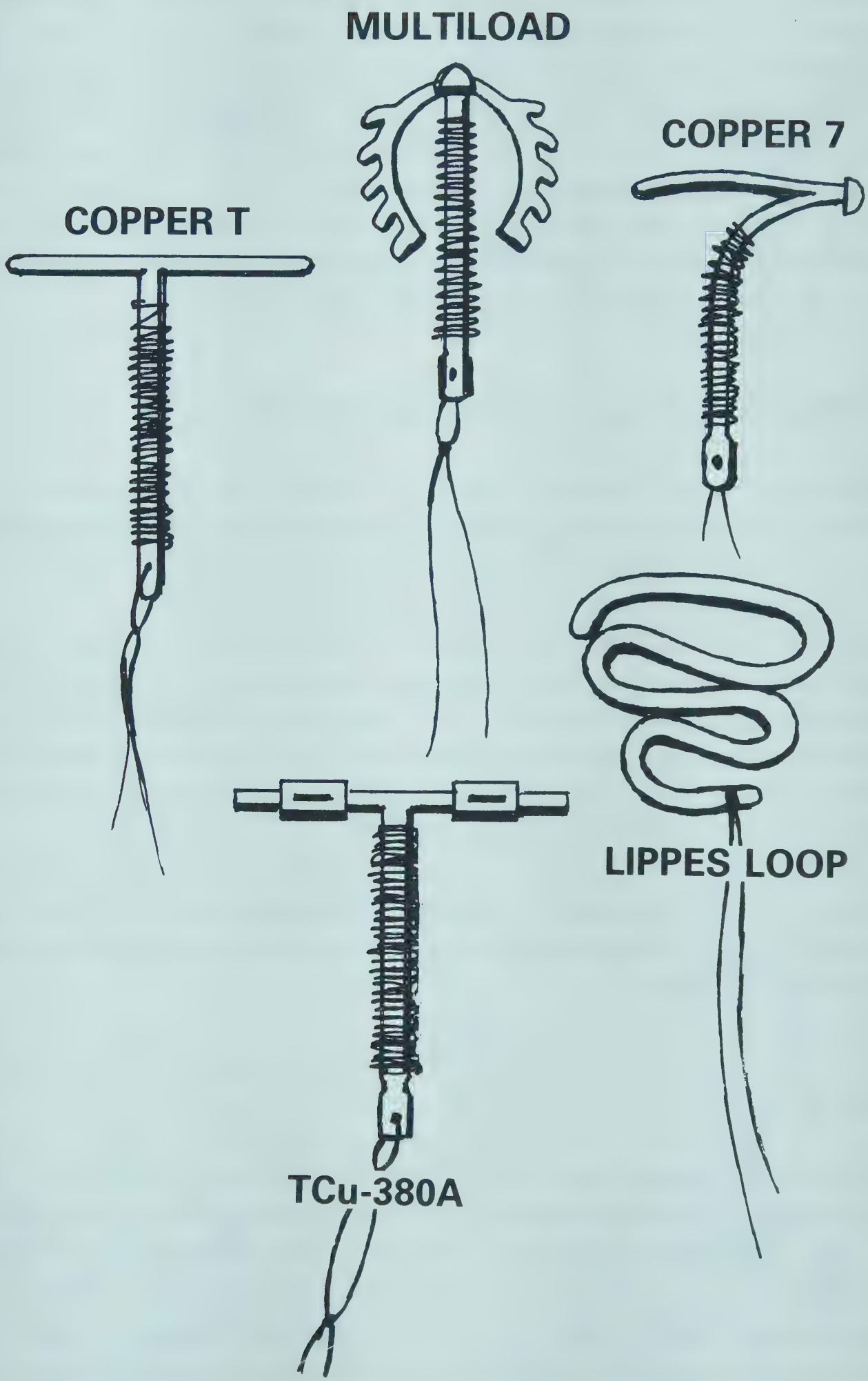
Insertion

It has been shown in several studies, mainly in developing countries, that the technique of IUD insertion or fitting is as easily learnt by nurses and midwives as it is by doctors. Ease of insertion largely depends on the frequency with which it is carried out, so that the doctor or nurse who only inserts an IUD occasionally will experience more difficulty and the women will have more side-effects. But whoever does the insertion must always undergo proper training.

Ideally, IUDs should be inserted at the time of menstruation, so as to ensure the woman is not pregnant. However, if she attends for an IUD fitting and comes from a long distance, it is better to fit her there and then, making sure if possible, during the pelvic examination that must be carried out before all IUD fittings, that she is not pregnant. IUDs can be fitted immediately post-partum. With careful training,

Fitting IUDs

Fig. 10 *Various IUDs in common use.*



this can be done within 10 minutes of expulsion of the placenta. They have to be placed high in the fundus of the uterus under sterile precautions, and an introducer is not needed at this early stage. Although the expulsion rate is fairly high, many IUDs so inserted remain in place. Since many women may not be seen later, this method gives them some chance of continued contraception.

After the bimanual pelvic examination to determine if the uterus is anteverted or retroverted, a sound is used to measure the uterine depth. The inert devices are inserted by pushing the IUD into the uterine cavity (Fig. 11), whereas most bioactive devices are placed (in their introducer) into the uterine cavity, the introducer then being withdrawn and the device left behind (Fig. 12). This is an easier technique and carries less risk of perforation, but for the experienced health worker, the insertion of the inert devices presents few problems in parous women. One copper-bearing device is placed on top of the introducer and inserted that way (Fig. 13).

Disinfection of instruments and IUDs

Instruments and containers must be boiled for 20 minutes in a sterilizer. The introducers for the Lippes loops must be disinfected in the same way. Plastic and bioactive devices cannot be boiled. Plastic devices should be placed for 20 minutes in a disinfectant solution. Aqueous iodine 1:2500 is the most convenient, and the colour change of the iodine to deep orange indicates that adequate disinfection will take place. Isopropyl alcohol (75%) can also be used. Great care must be taken to see that the disinfectant is strong enough and is not contaminated. IUDs must not be disinfected together with other devices such as catheters or flatus tubes.

The bioactive devices are supplied already sterilized (by gamma radiation) in pre-packed containers. If the packaging is broken and sterility lost no attempt should be made to resterilize them and they should be discarded.

Pain

Women may experience some pain at the time of insertion, but seldom once the initial insertion is over. Sometimes there is pain at the time of menstruation for the first few months; this usually decreases after that time. If not, the device may have to be removed. Pain can be due to uterine contractions attempting to expel the device, or may be due to partial perforation of the uterus. The stem

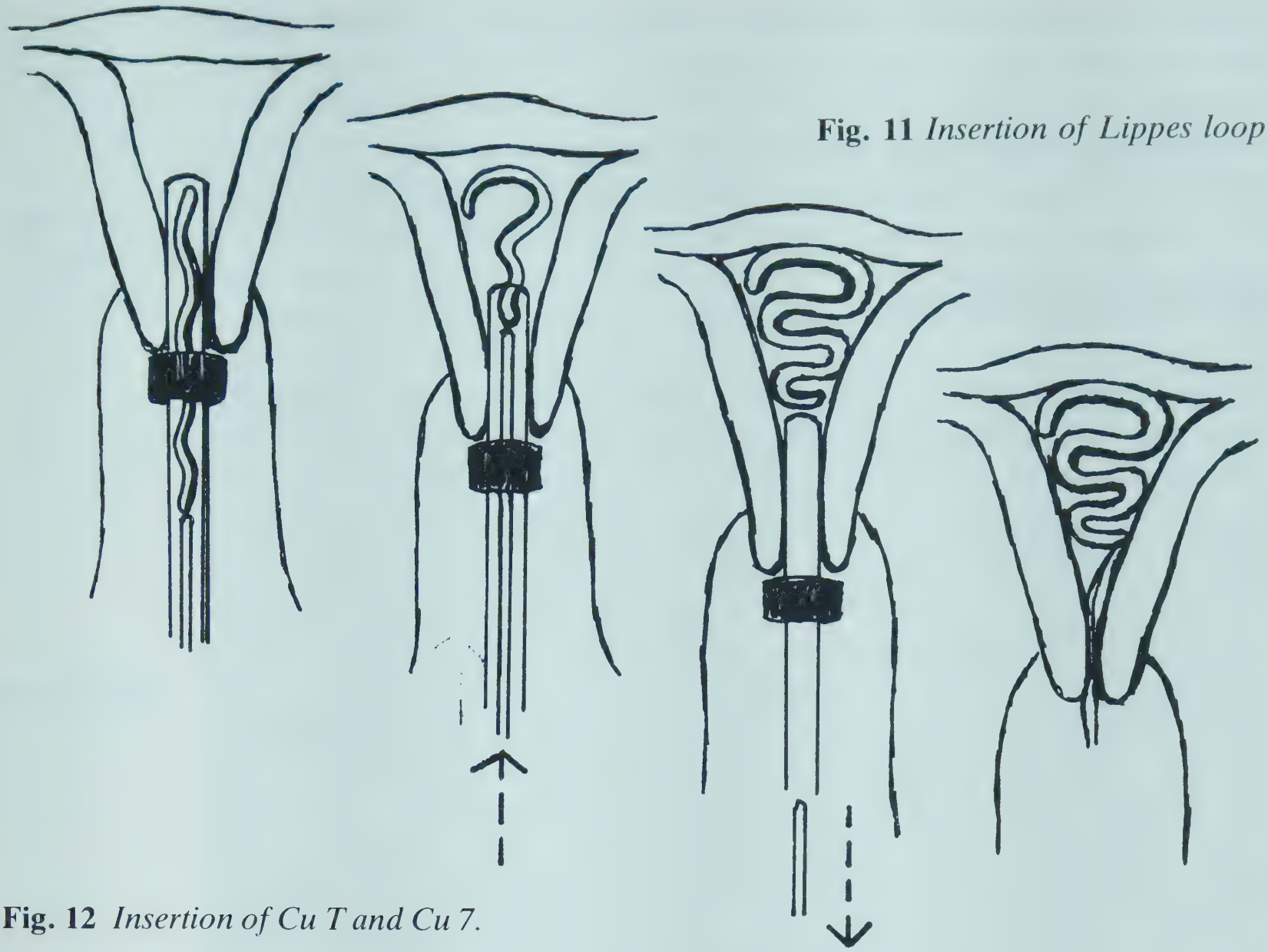


Fig. 11 *Insertion of Lippes loop.*

Fig. 12 *Insertion of Cu T and Cu 7.*

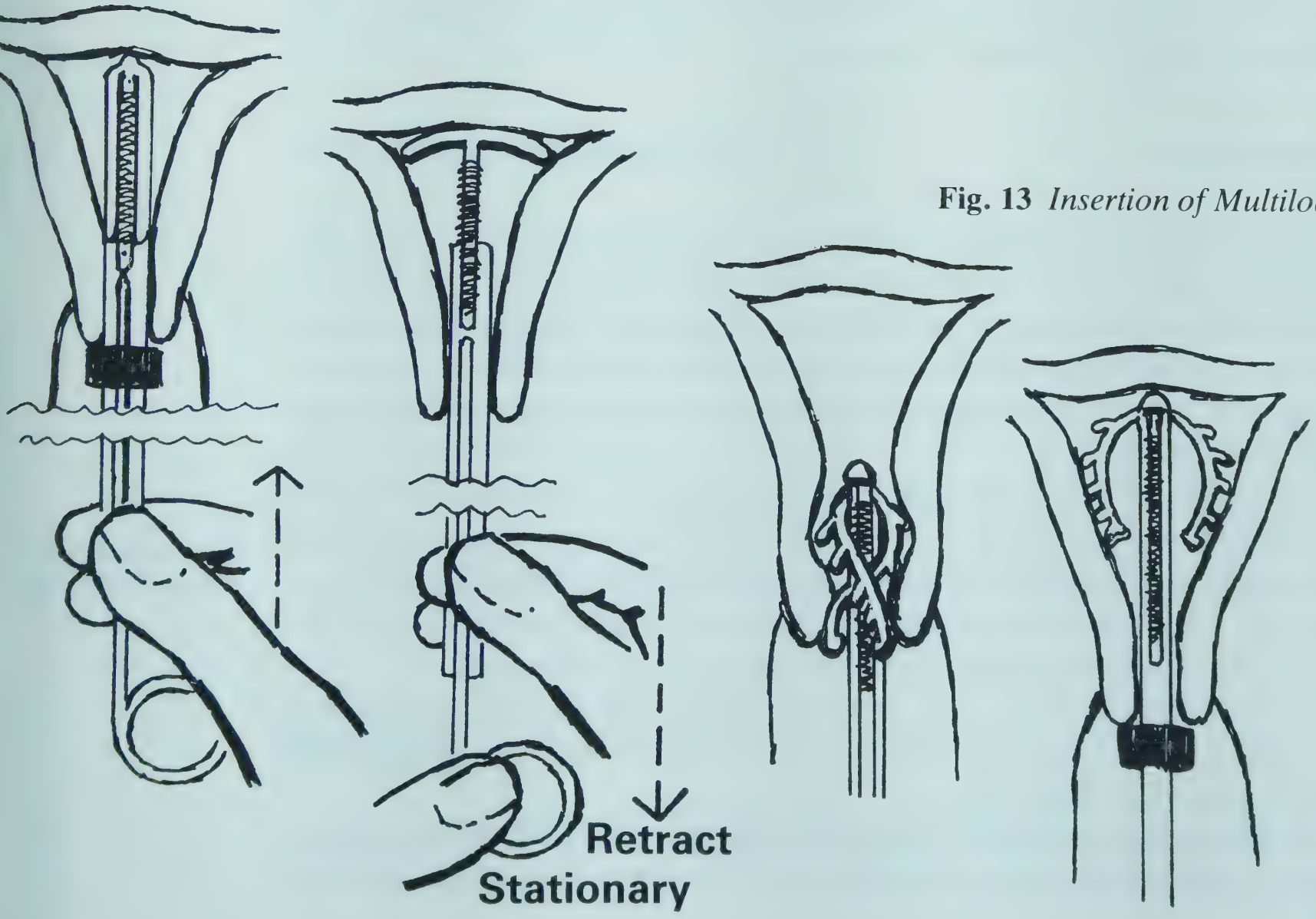


Fig. 13 *Insertion of Multiload.*

of the device itself can sometimes be felt protruding from the cervix — if so, the device must be removed and another smaller device inserted.

Pain may be associated with an early ectopic pregnancy. It can also be due to localized infection or pelvic inflammatory disease (PID).

Menstrual bleeding

This is likely to be heavier in the early months of use unless the woman is experiencing lactational amenorrhoea. Larger inert devices produce heavier bleeding than smaller devices, but with copper devices the duration of bleeding can be longer. Consequently, a heavy five-day bleed with a Lippes loop may be acceptable to a woman who views menstruation as a healthy 'washout', whereas the prolonged but lighter loss with a copper device may be less socially acceptable. The risk of anaemia has to be remembered, but protection from pregnancy, the major cause of chronic anaemia, usually more than compensates for the slightly increased loss. In hookworm areas two doses of an anti-helminth treatment given at the time of the IUD insertion are very effective in preventing anaemia. At the follow-up the nurse or midwife must check for anaemia (the mouth and inner eyelids or the inside of the labia may provide a useful indication in dark-skinned women), and iron or hookworm therapy should be given if necessary.

Risk of anaem

Expulsion

Most IUDs have threads which pass through the cervix into the vagina. After insertion these should be shortened so that they are just long enough to wind backwards over the cervix. Threads that are too short may be retracted into the cervix or uterus. Women can be taught to feel the threads and many like to be reassured that their device is in place.

Expulsion is more common in the first year with the smaller devices, in young women of low parity, and in post-partum insertion. If expulsion is unnoticed pregnancy may follow. At follow-up if no threads are present three things may have happened:

Pregnancy ma follow expulsi

1. The device has been expelled (check for pregnancy).
2. The device may have rotated inside the uterus, pulling the threads up with this movement. It would then have to be removed and a new IUD inserted.
3. The woman may be pregnant and the threads will have been pulled up into the enlarging uterus.

Pregnancy

Watch for ectopic pregnancy

There is a small pregnancy rate of about 2-3 per 100 woman-years for all devices, and so far no one device has been found to be consistently more effective than another. Most pregnancies occur in the first year of use. Occasionally a pregnancy is ectopic and, as the frequency of these ectopic pregnancies does not get less with time, the risk of any pregnancy that occurs being ectopic is much greater if the device has been in place for several years. This is because the chance of an intrauterine pregnancy gets less with time.The possibility of an ectopic pregnancy has to be kept in mind and needs to be excluded if symptoms and signs point to its presence.

A pregnancy may follow an expulsion or may occur with the device in place. If so the IUD is extra-amniotic and cannot damage the fetus. However, the pregnancy outcome is poor with an IUD in the uterus. There is a substantial risk of early or late abortion. Removing the device by gently pulling on the threads does not increase the risk of abortion and does away with the possibility of erosion of the membranes around the fetus with intra-amniotic infection. If the IUD cannot be removed, the woman must be warned of a threatened second trimester abortion, since there have been reports of serious infection in some of these cases. If the device remains in the uterus until the labour, the attendant must be sure it is expelled with the placenta and membranes.

Perforation of the uterus

This always sounds alarming, but usually the only side-effect with an inert device, if the perforation is not known about, is that the woman is liable to become pregnant. Perforation can be painless and usually occurs at insertion, especially when insertion is between one and six weeks post-partum and a pushing insertion technique is used. However, all devices may work their way through the uterine wall if embedded in it. The Lippes loop is unlikely to cause bowel obstruction and can be left in the abdomen. A copper device must be removed by a surgically experienced doctor, because the copper can cause an inflammatory reaction in the peritoneal cavity.

Infection

It is now generally accepted that there is sometimes an association between pelvic inflammatory disease (PID) and IUD use. However,

the great majority of women with PID do not wear an IUD, and the great majority of IUD wearers do not have PID.

Association of PID and IUD us

The various organisms responsible for cervicitis appear to spread to the uterine tubes more easily if an IUD is being used. Sometimes the organisms are those of gonorrhoea or chlamydia, associated with a wide variety of other aerobic and anaerobic bacteria. Fever may not be associated with PID, but where a high fever occurs in a woman using an IUD it must be investigated fully.

Women having many sexual partners are more likely to have higher rates of PID unrelated to the use of an IUD. Consequently these women should not be advised to use IUDs. For a nulliparous woman it is not the method of choice, because of the risk of infertility following pelvic infection. At follow-up the signs of PID are pain in the lower abdomen, tenderness in the vaginal fornices, and discharge from the cervix. The device is often left in place until 12 hours after the start of antibiotic treatment, since in the acute stage removal may cause a flare-up of the infection.

Conclusion

Good follow-up can result in successful long-term use of IUDs, and poor follow-up the reverse. The first essential is easy access by the woman with an IUD to the nurse, midwife, health worker or family planning clinic. A health worker in a rural area may give more effective follow-up than a medical team situated a long way away. In rural areas, the ideal place for IUD follow-up is the health centre carrying out infant welfare, ante-natal examinations and family planning. This will usually be easily accessible, well known to the women, and well placed to give general medical care and treatment.

Diaphragms and caps

There are two main contraceptive barriers used by women — diaphragms and cervical caps. Diaphragms are the more commonly used of the two. They are circular dome-shaped devices made of latex rubber, with a metal spring in the outer rim. There are three different types (Fig. 14) and each is made in various sizes, usually increasing in 5 mm steps from 50 to 105 mm in diameter. They should be used with a spermicidal cream or jelly (see page 54). The different types of diaphragm suit different women, depending on their genital anatomy.

Cervical caps are also of three different types: cavity-rim, Vimule and vault (Fig. 15). They should also be used with a spermicide.

Teaching diaphragm fitting

Nurses and midwives may have to instruct women how to fit diaphragms and caps and should be trained to do this. The woman should have the basic facts about her pelvic and genital anatomy explained to her so that she will understand how the diaphragm or cap will lie in relation to her cervix and uterus. The fitting procedure should be carried out without haste and each step should be carefully explained to the woman in words and language she can understand.

The nurse or midwife should first carry out a pelvic examination to be certain of the position of the uterus and cervix. She should also estimate, perhaps with fitting rings, the size of diaphragm or cap that will fit over the cervix without being displaced or expelled or becoming uncomfortable. A device should be selected and inserted. Diaphragms have their edges compressed (Fig. 16) between the fingers. They can then be slid into the vagina, lying across the diagonal length of the vagina from behind the symphysis pubis to the posterior fornix, thus covering the cervix. Usually the largest diaphragm that can be fitted without causing discomfort is the correct one. If a cap is used it will fit snugly over the cervix.

After the nurse or midwife has inserted the device, the woman should be asked to examine herself to find out how the diaphragm or cap feels when in place. She can feel the cervix through the thin dome of the diaphragm (Fig. 17). Then she should remove the device herself and insert it, lying down, squatting, or with one leg up on a stool or box, whichever she finds most comfortable. She should then be re-examined to see that she has fitted the device correctly. It does not matter if the device is inserted with the dome upwards or downwards.

When the diaphragm or cap is used, about a teaspoon of spermicidal cream or jelly should be placed in the dome of the device on the side which will touch the cervix. The edges should also be

Fig. 14 *Various diaphragms.*

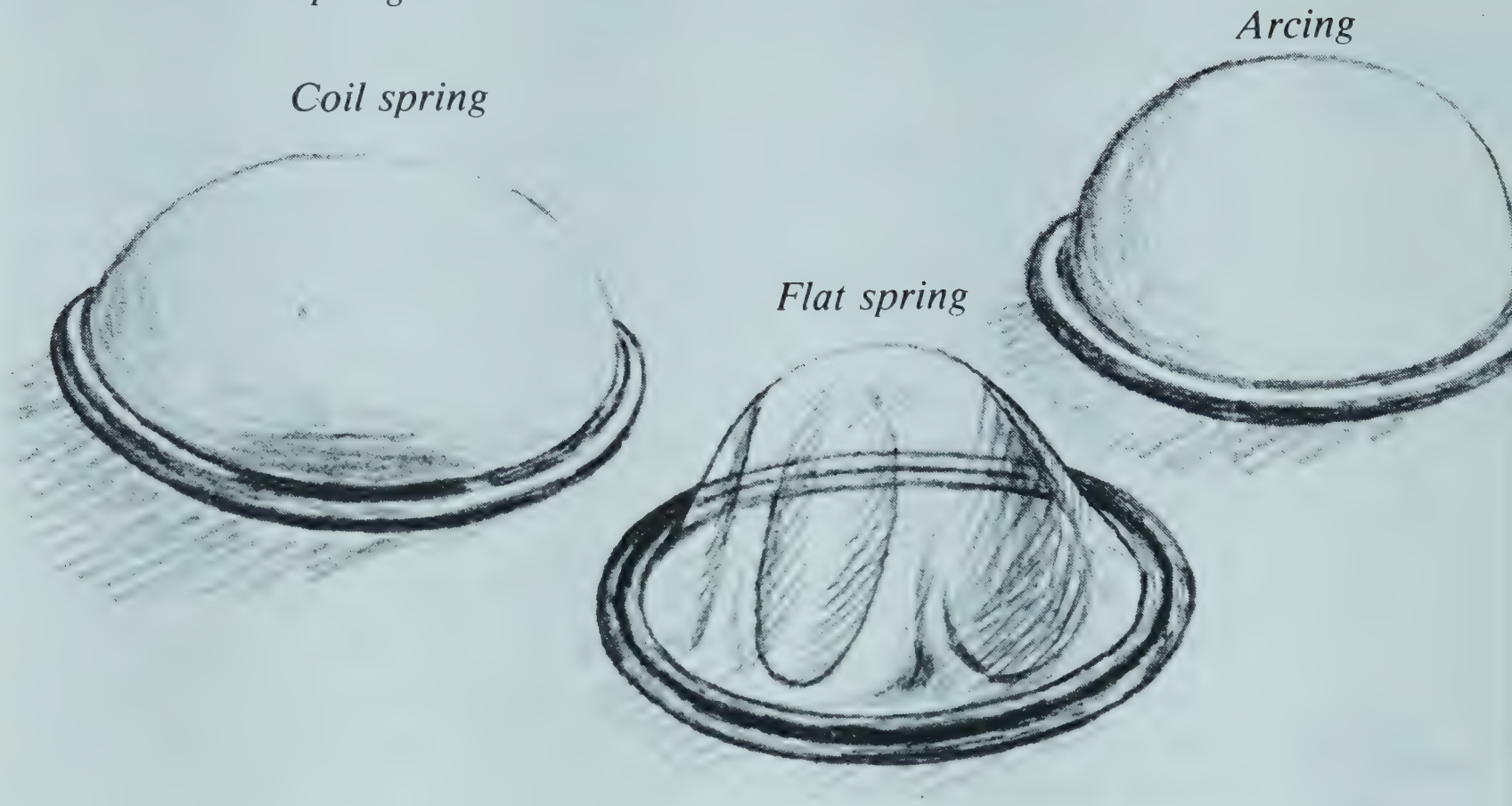


Fig. 15 *Various cervical caps.*

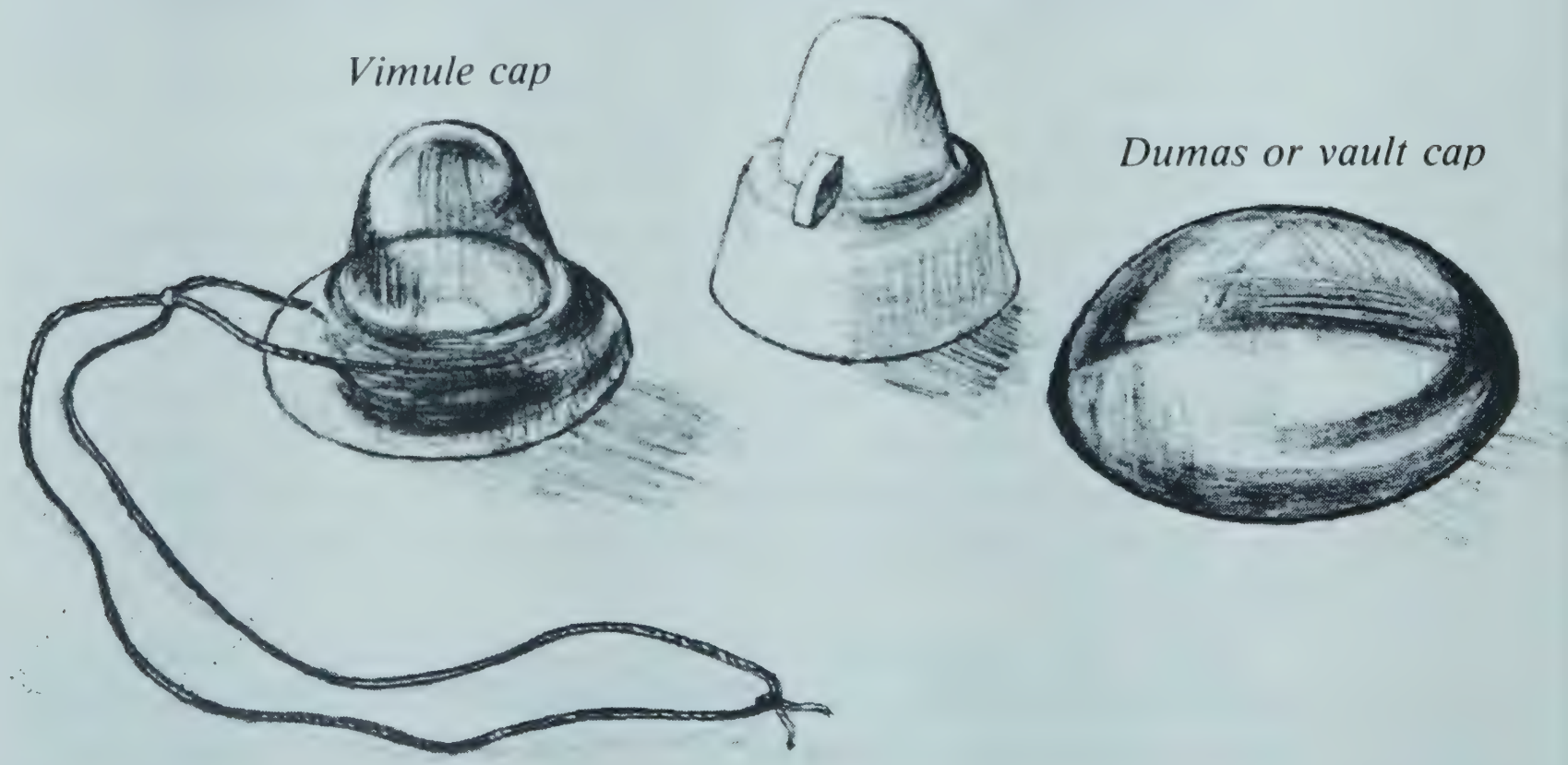


Fig. 16 *Coil spring and arcing diaphragms ready for insertion.*

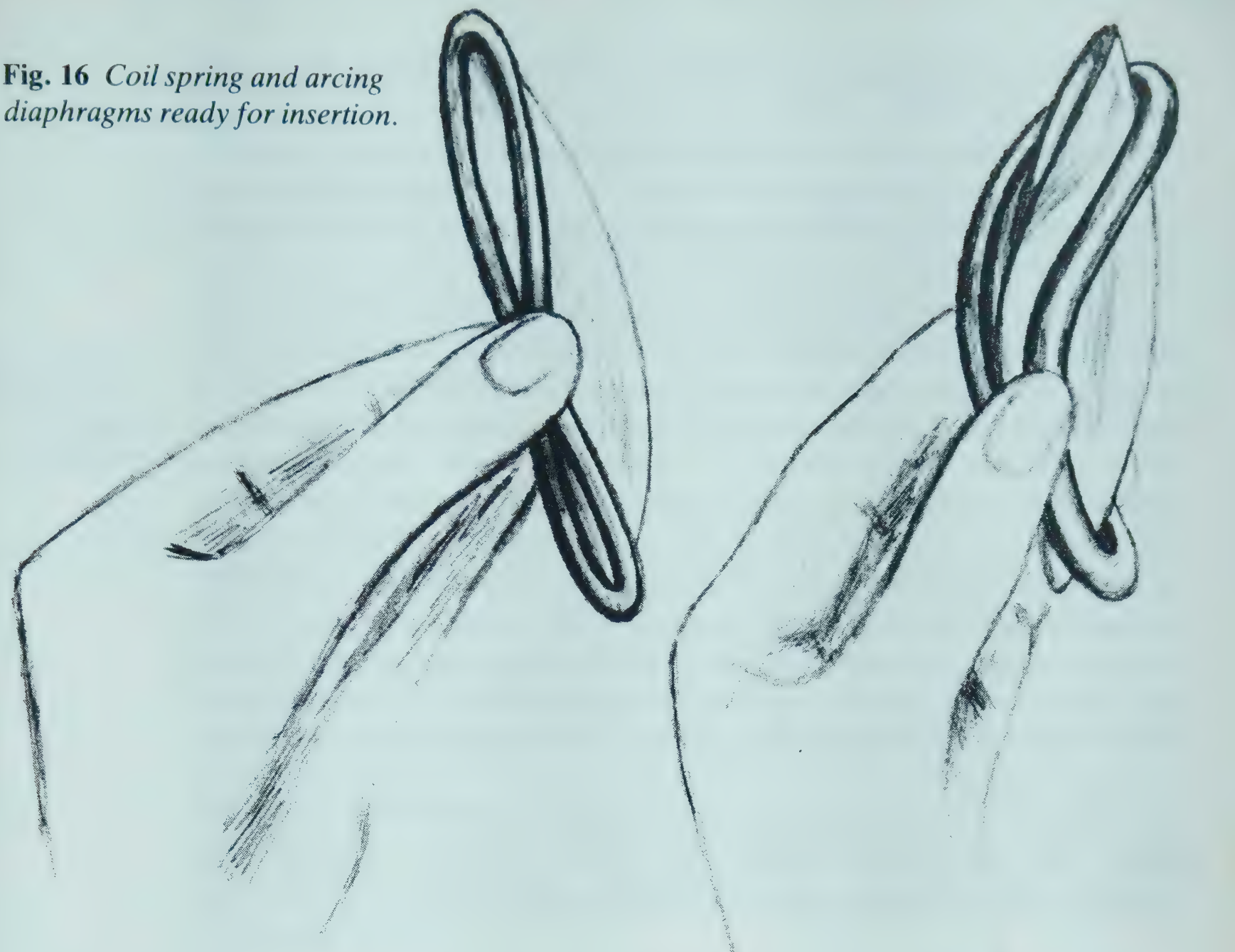
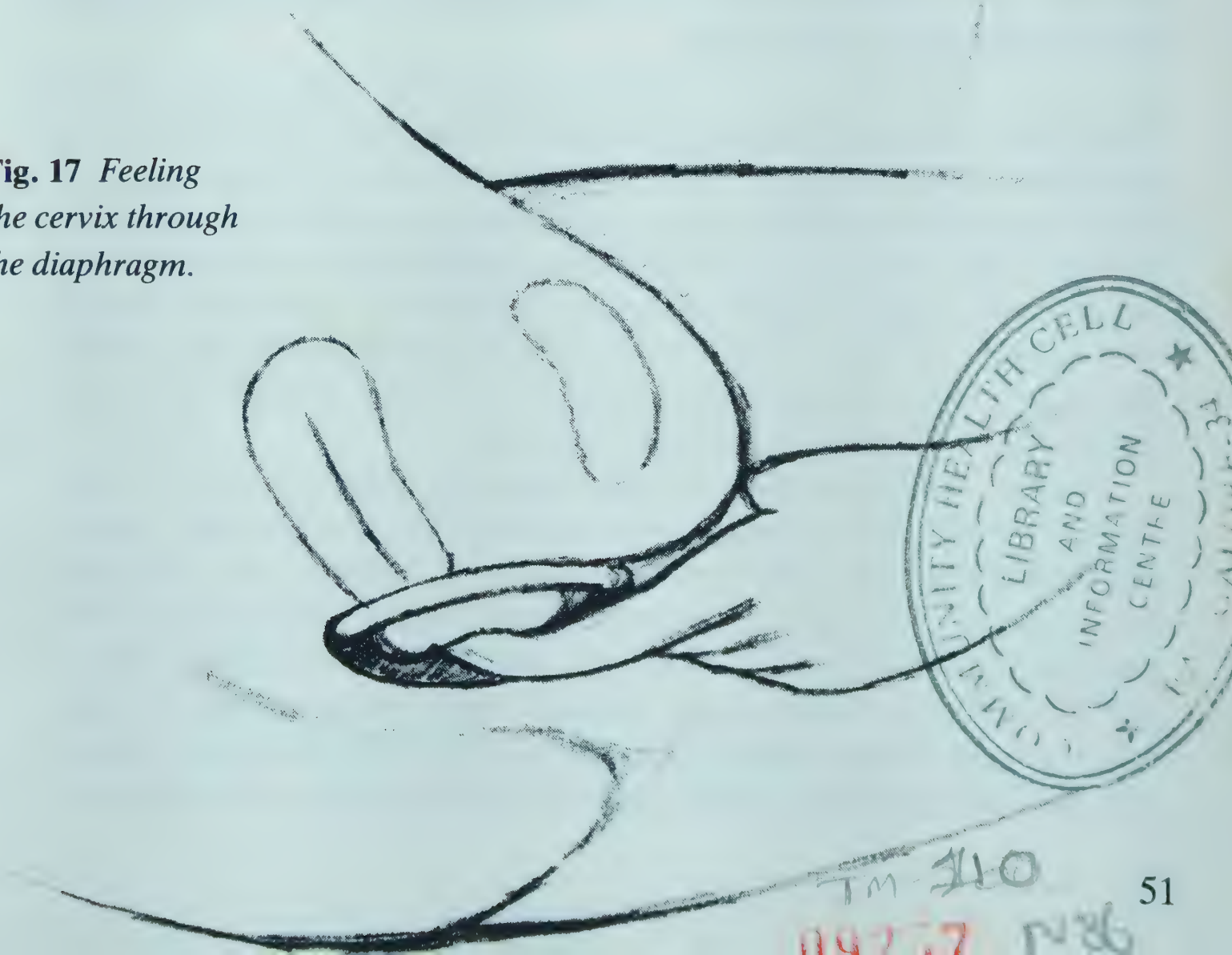


Fig. 17 *Feeling the cervix through the diaphragm.*



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smeared with spermicide. A little should be placed on the outer surface of the device as well.

If practicable, the woman should be given a diaphragm to practise with at home, using another method of contraception till she is confident in its use, and then be asked to come back to the clinic with the device in place for it to be checked.

If sexual intercourse does not take place within three hours of insertion of the device, additional spermicide should be placed in the vagina. Also extra spermicide is needed for every further act of intercourse while the device is in place. The diaphragm or cap should be left in the vagina for six to eight hours after the last act of intercourse to make sure all the sperm in the vagina are dead before the cervix is uncovered. The diaphragm or cap should not be left in place longer than 24 hours. When removed, it should be cleaned with water and a mild soap, dried and stored in a closed container. This may not be easy under certain circumstances (see below). Before use the device should be inspected for holes or deterioration (brittleness or stickiness of the rubber). This is particularly important in tropical areas.

Using the diaphragm

Some women cannot bring themselves to handle their genitalia, apart from the cultural objections mentioned below. In such cases another form of contraception should be advised.

Some difficulties over the use of diaphragms or caps in developing countries

Two generations of women in the UK, the USA and many other developed countries have used a diaphragm or cervical cap as one of their methods of contraception. However, it is a method requiring strong motivation, and although successfully used in developing countries by educated and motivated women such as doctors, nurses and others, it has some limitations in those countries. These limitations apply to personal aspects of its use as well as to the difficulties of storage and supply problems.

Barriers require privacy for insertion and removal and a ready supply of water for washing and somewhere for safe-keeping. Simple village life does not often provide all three. Barriers are a method closely connected with the sexual act, and both the husband and wife will know that a barrier is being used. Some men, certainly in parts of Africa, object strongly to any foreign body being present in their wife's vagina during sexual intercourse. Some object to the spermicide and feel that the method makes a natural act an unnatural one.

Problems in developing countries

Education of the couple, and especially of the male partner, may be needed to overcome these objections.

There are also special difficulties over insertion. In some parts of the world the right hand is kept for social greeting and for use in eating, the left hand being kept for toilet purposes after defaecation and is consequently looked upon as dirty. It is difficult for a woman to use her unskilled left hand alone to insert a diaphragm or cap and many make this the reason for their reluctance to attempt the method. This right and left hand culture is widespread throughout developing countries and will be familiar to nurses and midwives working there.

The right and left hand culture

The arrangements for supplying barrier methods are sometimes difficult. Except in large urban clinics, family planning is usually carried out in multi-purpose health centres, small buildings with limited cupboard space, often a long way from a town. Different sizes of diaphragms and caps have to be available in adequate numbers. The commonest diaphragms needed are those with 70, 75 and 80 mm diameters. The boxes occupy a lot of space and within a year the heat in tropical countries is likely to have affected the rubber so that new ones are required. The spermicide is also bulky to store. Programme administrators view the storage, the capital expenditure and short shelf life with concern, compared to those of oral contraceptives and non-sterile IUDs.

Conclusion

In spite of the difficulties mentioned above, it must be remembered that barrier contraception when properly used is an efficient method. It is free from life-endangering side-effects such as those found very occasionally with hormonal contraception, or the possible occurrence of pelvic inflammatory disease as sometimes happens with IUD use. Apart from allergy to rubber or to spermicides, barrier contraception is virtually free of side-effects.

Spermicides

Spermicides used alone in the vagina are not as effective a method of contraception as when used with a diaphragm or cap.

Spermicides are made in many different forms, but with all of these the intention is to leave enough active ingredient in the vagina to meet the challenge of a full ejaculate. There is a short waiting time between insertion and full effectiveness, which in turn only lasts for about one hour.

Types of spermicides

There are pessaries with spermicide incorporated, but these are unsuitable for use in hot countries as they may melt before use. Solid tablets which release carbon dioxide foam on contact with water are available. They are dipped in water before insertion and foam reaches the vaginal vault within 10 minutes.

Spermicide is also available in a foam in an aerosol pack which fills a syringe-like introducer, and is rapidly effective. Spermicides in the form of cream or jelly are available in tubes for use with diaphragms or caps. The more transparent jellies or creams are preferable, since the thick adherent white cream may remain on the penis and in the vagina. In areas of the world where gonorrhoea is particularly prevalent, there are often taboos on sexual intercourse with a woman who has a vaginal discharge, and a white spermicidal cream may look like this.

For young couples with high fertility these spermicides will give little protection. Their main use is with diaphragms and caps. However, they can be more effective in older women, in the years before the menopause. They are then more likely to be successful because fertility is low.

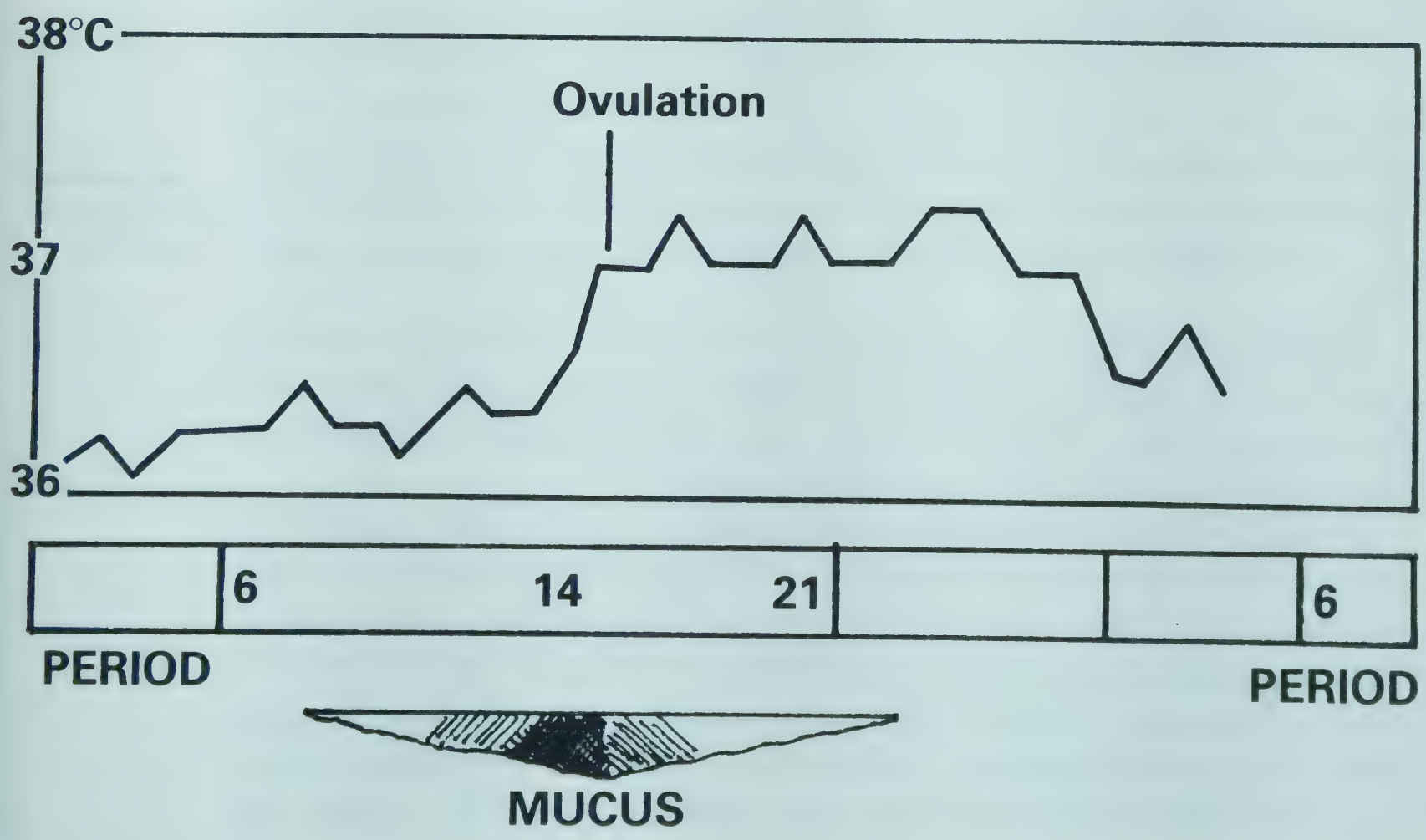
Contraceptive sponges act as carriers for a spermicide. They are made of polyurethane in the form of a flattened sphere with a recess on one side that is intended to fit over the cervix, and they are impregnated with one gram of nonoxynol-9 as the spermicide. A loop is attached to aid removal. They should be considered as a spermicidal method rather than as a barrier method. They may safely be inserted up to 24 hours before sexual intercourse and be left in place for a total of 30 hours. However, they can be used on one occasion only and so are expensive as well as bulky to store, and their failure rate is similar to that of other spermicides when used alone. Consequently they are not as effective as diaphragms, IUDs or oral contraceptives.

Periodic abstinence

This method depends on the fact that there will be some days in the monthly cycle when the woman will be relatively infertile. Sexual intercourse on these days may therefore be considered to be safe. It has the advantage that it wins the support of the Roman Catholic Church. It is without cost and can be taught by a nurse or a lay worker.

The infertile days can be calculated roughly by knowing the menstrual period dates for a whole previous year. They can also be predicted by the woman abstaining from sexual intercourse from the time of her period and taking her own temperature first thing every morning. Three days after the temperature rises it will be safe to resume intercourse (Fig. 18). Both these kinds of calculations need skills and recording abilities which require some education and literacy.

Fig. 18 *Graph showing the sustained rise in temperature at the time of ovulation. Also the change in the cervical mucus from about Day 9 when ovulation is at Day 14, from a viscid scanty mucus to a thin watery elastic one, and then tailing off after Day 15 to a viscid scanty state again before the next menstrual period.*



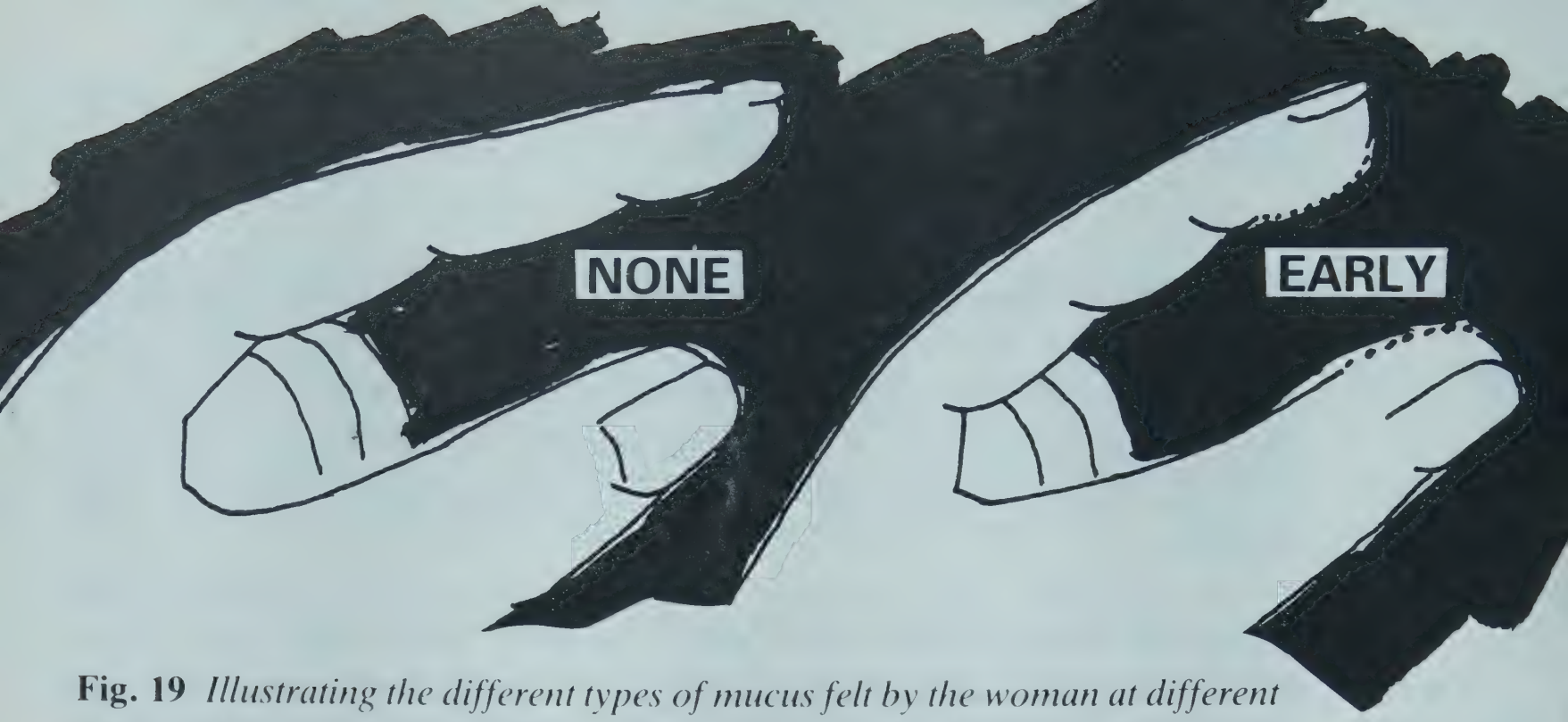


Fig. 19 *Illustrating the different types of mucus felt by the woman at different times in the monthly cycle. The two illustrations on the right show the mucus that is felt during the fertile days.*

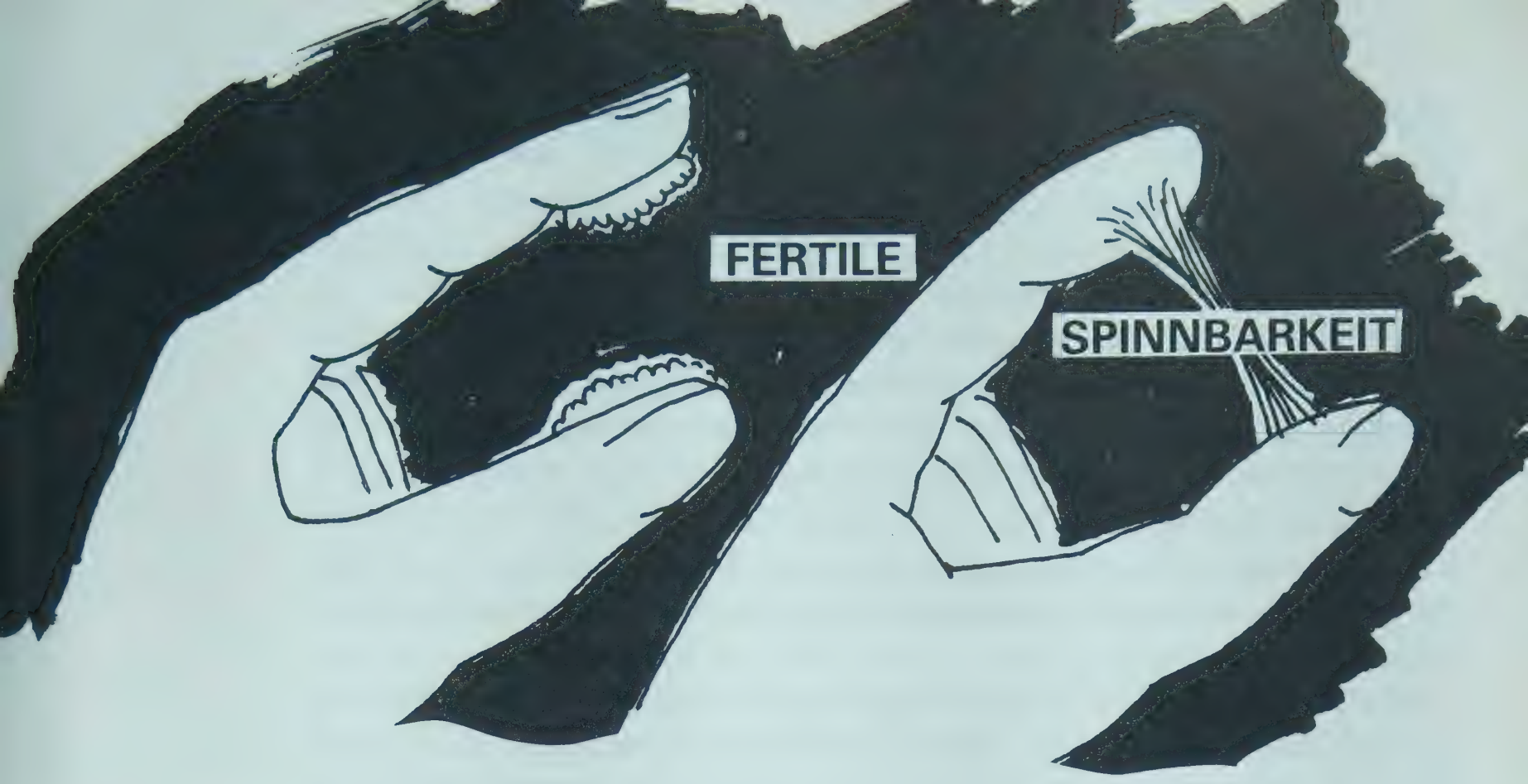
A third method is to observe the changes in the cervical mucus. This depends on the mucus being clear and watery but also elastic at the time of ovulation (usually about the middle of the menstrual cycle), when fertility is at a maximum. The instructions are to wipe the vulval area after passing urine and to look at the moisture there. A woman can learn to feel the mucus; if it forms a long string between the fingers (known as 'spinnbarkeit'—Fig. 19), she is fertile. This, too, is difficult to practise. It needs careful instruction, often best given by women who already use this method.

Temperature and mucus methods

The temperature and mucus methods must be taught by a trained person. The nurse's responsibility is to understand the outline of the method and help the potential user to decide about the method. If the couple want to use the method she can teach it if she is trained to do so, or else find a suitable place where it is taught and refer them there.

Periodic abstinence is not suitable for women with very irregular cycles and it cannot be used when fertility is returning after a delivery because the first ovulation (which may lead to another pregnancy) may not be preceded by a menstrual period.

Ovulation occurs about the middle of the monthly cycle, usually 14 days before the next menstrual period begins. The variation in the length of the cycle depends on variations in the time of ovulation. The days immediately before ovulation are fertile because sperm can survive for about two days in the uterine tubes and so fertilize the egg when it appears. However, by two to three days after ovulation the egg has deteriorated and is no longer fertile. The value of



understanding the fertile days in the month is clear when giving advice on infertility.

Quite a number of couples who know about the fertile and infertile phases of the cycle and who can pinpoint them accurately using the methods mentioned above, rely on barrier contraception during the fertile phase rather than abstinence. Provided they know how to be as aware as possible of the time of ovulation ('fertility awareness'), the use of no method during the infertile phase and a barrier during the fertile phase is a useful compromise and suits many couples.

Breast feeding as a contraceptive method

The sucking of the baby on the mother's nipple sends messages back to the pituitary gland which prevent the production of the gonadotrophins FSH and LH and so stop ovulation (see page 28). It is not the production of breast milk which is important, it is the frequent sucking at the nipple. Where this occurs throughout the day and the night, whenever the baby wishes (because the baby sleeps beside the mother), the frequency of stimulation from the sucking is sufficient to prevent ovulation.

In those parts of the world where breast feeding continues for two years or more, the woman is likely to have no menstrual period for at least a year and will have a very effective natural form of contraception during at least part of this time. However, where women do not follow demand feeding and restrict the baby to four-hourly feeds, with a seven-hour break at night, the sucking stimulus is unlikely to be sufficient to prevent ovulation. It is clearly in the best interests of the mother and the baby, and the family limitation programme, that she should be encouraged to follow the natural demand-feeding customs by day and by night.

Demand feedi important

In order to encourage full lactation to become established, the new baby should be put to the breast as soon after delivery as possible; then the baby will get colostrum. Colostrum is of vital importance to the baby as it contains a high concentration of maternal antibodies and other substances which protect the baby from infections. Immediate suckling will also help the important bonding process between mother and baby. The stimulus of sucking also causes the release of prolactin from the pituitary to ensure the secretion of milk, and of oxytocin to help the flow of milk. Oxytocin also aids in the contraction of the uterus. Midwives and obstetricians have been slow to recognize the importance of colostrum, although veterinarians have known it for a long time. The new baby therefore should suck repeatedly in the early days before the full milk flow is established.

Breast feeding is sometimes difficult to establish and may fail if the mother and baby are separated after birth — she should be given her baby to hold right after the birth. Where a baby needs to go to a special care unit the mother should be encouraged to visit and to breast feed or express her milk. This will help bonding to some extent. There is an increase in the rejection of babies treated in special care units, when the mother has not been involved in caring for and feeding her baby.

The successful establishment of early lactation depends mainly on the baby being breast fed at birth and being fed frequently on demand. The nurse or midwife can help by encouraging early and repeated sucking, emphasizing the value of colostrum and seeing that the baby lies in the bed with the mother or in a cot alongside (neither at the foot of the bed out of reach, nor in a nursery). In this way the baby will be able to breast feed as much as it wants. Another aspect of this type of suckling is that it will prevent cracked nipples. Lactation fails when the breasts become so engorged that emptying is not achieved. This happens when there are long gaps between feeds and the natural stimulus for more milk production is reduced.

The cause of lactation failing or becoming reduced is insufficient sucking, so this should be encouraged throughout the night, hence the world-wide custom of mothers sleeping beside their babies. Sucking also has to be of sufficient length, and if additional food is given between feeds when the child is too young, the breast will be insufficiently emptied and less milk produced. Unfortunately, the pressures on many urban women to go back to work causes lactation to fail or to be discontinued. One consequence is that the protective quality of breast milk is lost and the baby becomes more prone to gastro-enteritis. It is important, therefore, that if a working mother can only breast feed her child in the early morning and at night, with bottle feeding in between, this should be encouraged and will give the child some protection. Some workplaces allow the child to be brought to work for breast feeding during the day, and this should also be encouraged.

Pressures to return to work

In most developing countries lactation is encouraged for at least two years and the woman is not expected to resume sexual relations during this time because of the taboo on sexual intercourse with a lactating woman. In these circumstances, she may live apart from her husband. It sometimes happens that he has more than one wife. The value of spacing births has been recognized in many societies; indeed the word 'kwashiorkor', describing malnutrition in childhood, actually means 'the disease of the displaced child'. The reason for the condition of the child is its early weaning and the fact that it receives little attention from the mother when a new baby arrives. Pregnancy may follow too quickly because ovulation can take place at some time during lactation, thus allowing a further pregnancy to occur following sexual intercourse. The taboo against intercourse during lactation prevents this situation arising, and tends to protect the existing children.

Contraception and the lactating mother

In the absence of breast feeding, ovulation is unlikely to occur for about five or six weeks after delivery, but pregnancy is possible after this time. The length of time lactational amenorrhoea lasts varies considerably, but in those areas where prolonged breast feeding takes place (two to three years) very few women are likely to have a menstrual period within two years. However, as ovulation precedes menstruation, some women will become pregnant without seeing a menstrual period.

If no contraceptive is used for the first six months of lactation there will be a small pregnancy rate (5%), which is not much higher than with the use of an IUD. To avoid these pregnancies, contraception in some societies may need to be started about five weeks post-partum. In most developing countries no contraception is needed until supplementary foods are added. The simplest method is often the progestagen-only Pill which does not affect lactation. When menstruation returns, other methods should be considered. Men and women are often reluctant to use any contraceptive method during lactational amenorrhoea. The combined Pill is likely to reduce breast milk and should only be tried when lactation is fully established, and even then with caution. The IUD, even inserted post-partum (see page 42), would be a suitable method during lactation. Special care must be taken during insertion, since uterine perforation has been shown to be more common during lactation.

Contraception and breast feeding

Male methods

1. Withdrawal (coitus interruptus)
2. Condoms

Withdrawal (coitus interruptus)

This is probably the most commonly used male method. The male partner takes full responsibility for the method, it costs nothing and is always available if the man can exert sufficient self-control.

In using this method, the man withdraws his penis from the vagina before he ejaculates. It needs self-control, but when the emission occurs well away from the vagina this can be an effective method. If, however, the emission occurs in the vulval area close to the vagina, the sperm may be able to swim up to reach the cervix and the method becomes ineffective.

Well-motivated couples seem happy to use the method for many years. It should not be ridiculed, though more effective methods can be suggested.

Condoms

These are known by many different names: rubbers, sheaths, etc, or by a manufacturer's name, e.g. Durex. In developing countries, they often have a local name. They consist of a thin sheath of rubber which may have a plain rounded end or a teat end (Fig. 20). They are sometimes lubricated and some have a spermicide incorporated in the lubricant.

The condom needs to be put on when the penis is erect and before

any seminal discharge occurs. Normal sexual intercourse can then take place and the sperm are prevented from reaching the cervix. The penis has to be withdrawn slowly, with the condom held carefully so that it does not slip off. Inexperienced users may pull a condom on so that it is fully stretched without leaving a space at the end for the ejaculate. To avoid this, about 1 cm should be left free at the end and flattened to hold the ejaculate. A teat-ended variety does not have this problem, but here too the teat end must be flattened as the condom is put on, to expel any air present.

How to use the condom

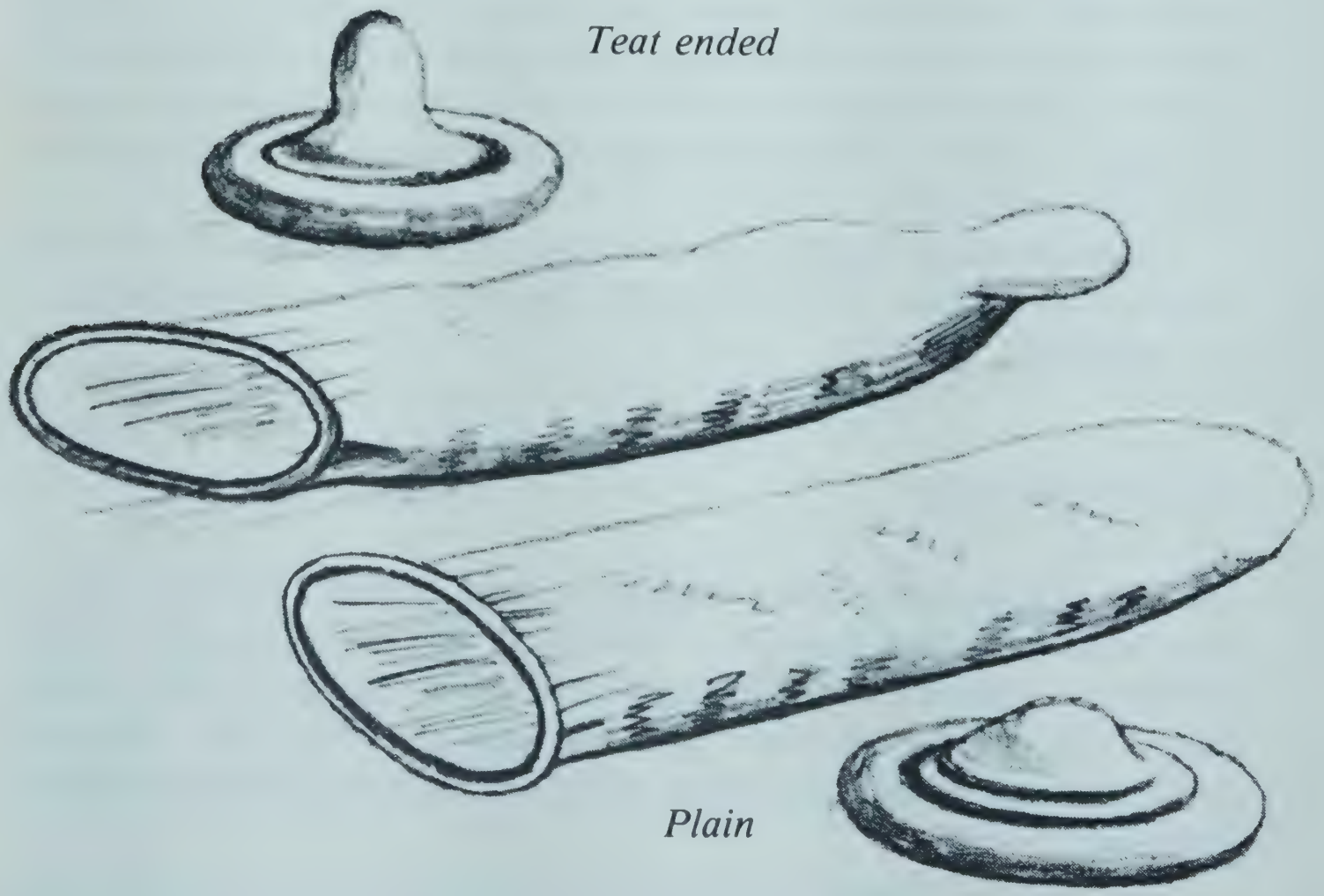
Nowadays condoms can be obtained in various colours as well as the more usual colourless transparent latex rubber. Some couples find that using coloured condoms increases their enjoyment. An important point to remember is that, quite apart from its contraceptive action, the condom can play an important role in sexual relations in protecting both the male and the female to a large extent from sexually transmitted diseases.

Teaching points

1. A new condom should be used for each act of sexual intercourse.

2. The condom should be unrolled onto the hard, erect penis, before the penis touches the woman's body.

Fig. 20 *Condoms – rolled and unrolled, teat-ended and plain.*



3. The condom is held at the closed end between finger and thumb to expel air and unrolled gently down the full length of the penis. Some women do this for their partner as part of their lovemaking.

4. Care should be used, since although the condom is strong it can be torn by sharp fingernails or rings.

5. After ejaculation the penis should be slowly withdrawn before it becomes soft, with the condom held firmly in position at the base of the penis so that no semen is spilt. The condom is slipped off when the penis is well away from the woman's body and then disposed of.

Training

When a nurse or midwife is discussing health education with young people, both the girls and the boys should be taught exactly how a condom is used. Some young men may be shy to admit their inexperience. The nurse should also teach the advantages of using a condom, especially for young people, and emphasize that it can give protection to both sexes against some sexually transmitted diseases.

Sterilization

Counselling for sterilization

Sterilization (sometimes called surgical contraception) of either the woman or the man can be carried out easily, and it is important for the person counselling a couple to make sure that they both understand what sterilization really means. They must be given the opportunity to ask as many questions as they want about the procedure, and the most important points to discuss are whether it is wiser for the man or the woman to be sterilized and that the procedure, to all intents and purposes, is an irreversible one. The couple must understand that the step they are taking means that the person sterilized can no longer have or produce further children. At the same time it is important for the counsellor to point out that both male and female sterilization have a small failure rate, with re-canalization of the tubes or the vasa.

Sterilization – a major step

Because of the important change sterilization makes in a person's reproductive life, counselling with patience and understanding is particularly important when discussing this subject.

From the technical point of view, vasectomy or male sterilization is a simpler operation than tubal occlusion or female sterilization. There may however be good reasons why the woman would or should rather have the operation.

It may not only be the couple who become involved in talking about the operation, but in some extended families the mother-in-law or other relatives may be strongly against the operation, or on the other hand may even be pushing the couple into having it against their will. In all cases, where possible, the partner's view about sterilization should be taken into account, whichever partner has the operation in the end. However, it is not necessary to get permission from both the man and the woman for the operation to be carried out on one of them.

Family pressures

In the case of male sterilization, the man has to be very clear about exactly what a vasectomy is. Some men believe that vasectomy is a form of castration or else they believe that they will become impotent and lose their masculinity. It may require patience and careful counselling to bring out this and other worries about sterilization, but such patience will be valuable if any hidden fears can be brought to the surface and discussed so that the couple know the true facts about the operation. The man also has to know quite clearly that he will not be sterile immediately after the operation, but that sperm can still be alive and potent for some weeks or even months. It is usually said that 12 ejaculations are needed before all live sperm have passed from the body. During this time, some adequate form of contraception, such as condoms, should be used.

A voluntary decision

Whoever does have the sterilization operation must make his or her decision on the basis of the information given by the counsellor, and that decision must be a free, voluntary, unpressured one. Neither partner should talk the other into the operation against his or her will.

It is not always easy for a female health worker to discuss sexual details with a man. In some cultures and religions, it may be more appropriate for a male nurse or health worker to carry out vasectomy counselling. The results of vasectomy are always best when a man sees that the operation is of benefit to himself either directly or indirectly.

Many couples will ask about reversal of the operation. It should be emphasized that they should look upon the operation as irreversible. However, there is a chance, depending on the type of operation carried out, of rejoining the vasa or the tubes, but this does not necessarily mean that a pregnancy will follow, and this must be explained clearly during counselling.

Nurses and midwives, provided they are trained in counselling, can probably be among the best counsellors because they know the people involved and usually have a close relationship with the local people among whom they work, in addition to their technical knowledge of the subject. It has been shown that a very few individuals do regret the operation at a later stage, but the great majority who undergo sterilization and have had proper counselling and time to think over the operation, are satisfied with it. It is therefore advisable, where possible, to leave a few days free after counselling for the individual or couple to think about what has been discussed. They may then decide that sterilization is not what they want, they may want to bring up further questions, or they may simply decide that they are quite happy to go ahead with the operation.

Female sterilization

The procedure of female sterilization consists of occluding or closing off the uterine tubes so that the egg and sperm cannot meet in the tubes and a pregnancy cannot therefore occur. In considering this subject, the ways of reaching the tubes must be looked at and then the various methods of closing them off must be examined.

Approaching the tubes

There are three common ways of operating to reach the uterine tubes. These are the mini-laparotomy approach, the approach carried out post-partum, and the use of the laparoscope. In some countries nurses and midwives have been trained to carry out the first two approaches, but laparoscopy has to be done only by fully trained doctors, preferably gynaecologists or surgeons.

Mini-laparotomy
This operation can be carried out under local or general anaesthesia. A small incision (about 2.5 cm) is made transversely just above the symphysis pubis and the tubes are brought to the surface in turn. This is often made easier with the use of a small instrument called an elevator, inserted into the uterus. This can then help to turn the uterus and bring each tube near to the surface.

Post-partum sterilization
This method of approaching the tubes is becoming popular, particularly in many developing countries. It is carried out within a few days of the birth of a baby, when the uterus is still high in the abdomen. Under a light general anaesthetic usually, or sometimes under local anaesthesia, a semi-circular incision is made in the lower curve of the umbilicus, so that the scar will not show afterwards. The tubes are then brought up to the incision by gently turning the large abdominal uterus with a finger, first in one direction and then in the other.

Laparoscopy
The laparoscope is inserted through a small abdominal incision just below the umbilicus. The abdomen is filled with gas so that the various internal organs can be seen through the instrument. The tubes are identified by the operator and occluded through the instrument. The use of the laparoscope not only requires great skill and frequent use, but it also depends on scrupulous surgical instrument care and an absolutely reliable electrical supply.

Occluding the tubes

There are various ways in which the tubes can be occluded once they can be reached either through an abdominal incision or through the laparoscope. The standard surgical method is to pull up a loop of the tube through the abdominal incision (this cannot be done through the laparoscope) and tie or ligate it in two places with plain catgut. The loop of tube is then removed between the ligatures. This is called the Pomeroy method. There are several variations on this method, with more extensive surgery.

Other methods of occlusion of the tubes include the use of clips or bands (rings) applied by special instruments which can be used through the laparoscope or through the incision of the mini-laparotomy or post-partum operation. Sometimes the tubes are occluded through the laparoscope by electro-coagulation.

There are a number of other methods still fairly experimental, including the injection of chemicals through the uterus into the tubes. There are also other ways of reaching the tubes by an incision through the vagina, thus leaving no abdominal scar.

Advice to the woman undergoing sterilization

The woman should understand that tubal occlusion carries a small risk of failure if one or both uterine tubes recanalizes. This is more common if the operation is done immediately post-partum. The woman should be reminded that she is sterile from the moment the operation is carried out. She should also be told that her monthly periods will continue until the time of her normal menopause and that her hormone production and libido will be unaffected.

Vasectomy

Sperm and male hormones are produced by a man's testes for the whole of his life. The male hormones pass directly into the blood stream while the sperm travel through the epididymis and up the vas deferens. When an ejaculation occurs it contains sperm together with secretions from the prostate gland and the seminal vesicles.

At vasectomy (male sterilization), the vas deferens on each side is cut so that sperm are not released into the ejaculate. The male hormones are not affected and continue to be passed directly into the blood stream. The ejaculate will not appear any different, since sperm form only a small part of it, and it will still contain the secretions from the prostate and seminal vesicles. However, it will

require at least 12 ejaculates after vasectomy to clear the residual sperm out of the end of the vas in which they are stored. During this time the man will still be fertile. Very occasionally, the cut ends of the vas may join up again after vasectomy and another operation will be necessary.

The operation is carried out under a local anaesthetic and a one centimetre incision is made in the scrotal skin on both sides. In some men this is entirely painless, although in others there may be some discomfort. Afterwards the scrotum should be supported by close-fitting underwear. General physical activity should be reduced for several hours in order to prevent bleeding in the scrotum. A small pea-sized lump can be felt on each side where the vas was divided, and this remains permanently. If severe pain or a large swelling develop after a vasectomy the man should see a doctor. There might be bleeding or infection in the scrotum.

Pregnancy

Pregnancy testing

All pregnancy tests depend on the detection of human chorionic gonadotrophin (hCG) in the woman's blood or in her urine. The source of hCG is the outer layer of the trophoblast after implantation has occurred, and it has been detected as early as the 25th day of the menstrual cycle in which fertilization occurred.

Radio-immunoassay is required for the very early detection of hCG; it is a very accurate method and the test becomes positive before or at the time of the first missed menstrual period. However, it is not widely available and is expensive.

Immunological tests are widely available, relatively inexpensive, and are satisfactory if carried out according to the instructions. A specimen from an early morning sample of urine can be tested 42 days after the start of the last period, and the result is almost immediately seen. False positives and negatives are rare, but there can be indefinite or uncertain results.

These tests are best carried out by nurses or midwives (although a do-it-yourself kit is available), as a careful technique and experience in reading results gives a much higher level of accuracy. Also some counselling and support is often necessary once the result is known. A negative test does not necessarily exclude an ectopic pregnancy. While the early embryo is alive and implanted in the wall of the tube the pregnancy test will be positive, but if the embryo has died in the tube, or after tubal rupture, the test may be negative. Very rarely, a positive pregnancy test can indicate a hydatidiform mole, rather than a true pregnancy.

Reading pregnancy tests

In some countries the Xenopus toad test is still used — concentrated urine from the woman suspecting pregnancy is injected into a female toad. If chorionic gonadotrophin (hCG) is present, the frog will produce spawn in about 15 hours — a slow result by today's standards.

Every pregnancy should be a successful pregnancy

With the present emphasis on family size limitation and planned one or two child families, it is increasingly important that every pregnancy has the greatest chance of a successful outcome and that a normal healthy child is born. For a mother to go through pregnancy only to deliver a child likely to die within days or weeks causes unnecessary suffering. Again, no mother would want a severely handicapped child if it could be avoided.

In areas of the world where there is great deprivation, maternal and infant death rates are high, but the pregnancy rate also remains high. When living conditions have improved, and children are seen to survive and grow up, families choose to have fewer children.

Pre-conception care

This aims at advising women on basic health care so that they are more able to become pregnant and carry a pregnancy successfully. It also aims at preventing the occurrence of some congenital malformations and diseases, hereditary diseases and the risks of mental and physical handicap in their children.

In many developing countries, especially in rural areas, ante-natal and post-natal care is limited. Therefore pre-conception care is almost unheard of. However, since nurses and midwives work in the community they have an opportunity to talk to young couples and give them this important advice before they start a pregnancy. Some points that could be emphasized are mentioned below.

Advice befo pregnancy

It is known that:

1. Pregnancies are more dangerous in young women (under 20) and in older women (over 35) and when they are too close (see page 13).

Advice: Women should plan their pregnancies between the ages of 20 and 35, with a gap of about three years between them.

2. Smoking and the consumption of alcohol may damage a fetus.

Advice: Alcohol or smoking should be avoided in pregnancy and at the time of conception. Also, a pregnant woman should avoid being in an environment where others smoke, since this too can affect the fetus. Smoking by other members of the family should therefore be avoided.

3. Rubella (German measles) in pregnancy may severely affect the fetus, causing blindness, deafness and heart defects.

Advice: Rubella immunization should be undertaken by every young woman more than three months before planning to conceive. It is best if this is done in primary school.

4. Women who are greatly underweight do not ovulate and may not conceive unless their weight increases.

Advice: Women should be of normal weight if they are to conceive and carry a fetus successfully through pregnancy. In many societies women used to eat specially nutritious food before marriage so that they were strong enough to bear healthy children.

5. Some vitamin deficiencies may increase the risk of neural tube defect.

Advice: Vitamin supplements and a good diet are advisable at the time of conception.

6. Immunization against tetanus given to a mother before or during pregnancy prevents neonatal tetanus.

Advice: In areas where neonatal tetanus occurs, adolescent girls should get a full course of tetanus toxoid, and pregnant women should have a booster immunization, or the full three immunization injections if none has been given before.

7. Malaria in pregnant women can cause a spontaneous abortion, premature labour, or a low-birth-weight baby.

Advice: In malarial areas, anti-malarial treatment should be given, especially in pregnancy.

These are only some of the basic health care factors involved.

Genetic counselling

Genetic counselling for a couple before pregnancy is often advisable if there has been some known abnormality or disease in themselves or a close relative. Some have reason to fear that they may produce a child with a developmental abnormality or a child who will develop a handicapping disease in childhood. Others may have lost a baby at birth for no apparent reason. In some parts of the world, the risks that parents run can often be assessed quite accurately so that the couple can make an informed decision on whether these are risks they feel able to take.

Ante-natal aspects of care

This is the opportunity for ensuring that tetanus toxoid immunization is given in those places where neonatal tetanus occurs and that anti-malarial treatment is given during pregnancy in malarial areas.

The pregnant woman should be told of the advantages of breast feeding to her and her baby quite early in the pregnancy. Vitamin supplementation is thought to be of greatest importance before and at the time of conception and therefore should be given when the woman begins to try to become pregnant. These measures of course are in addition to routine obstetric care during the pregnancy, such as regular examinations, blood pressure checks and urine testing.

Amniocentesis

Where indicated, examination of the amniotic fluid by amniocentesis (insertion of a needle through the abdominal wall into the uterus to remove some fluid) is carried out at about 16 weeks. This gives an opportunity to make an ante-natal diagnosis of some serious congenital abnormalities or hereditary diseases which may be present in the developing fetus.

The amniotic fluid that is removed is separated from the shed fetal skin cells dispersed in it. It is examined for the substance alpha fetoprotein. The level is raised where the fetus has a neural tube defect or exomphalos (escape or hernia of the abdominal contents into the umbilical cord). The fetal cells themselves can be cultured and the fetal chromosomes may be able to be examined, showing various congenital conditions such as Down's syndrome. The sex of the fetus can also be determined from the chromosomes at this stage. It should be remembered that it is the chromosomes passed on from the man's sperm at fertilization that decide the sex of the fetus — a Y chromosome means a male fetus and an X means a female. The woman's chromosomes play no part in the make-up of the sex of the offspring. Determination of the fetal sex would be particularly useful in the diagnosis of sex-linked hereditary diseases.

Only a few highly specialized laboratories are able to carry out these investigations, and the results have to be known within a few weeks so that if a selective abortion is indicated it can be performed before the fetus is viable. If the parents are totally opposed to the idea of a selective abortion, amniocentesis should never be carried out. Counselling needs to be given before the 16th week of pregnancy to enable the couple to have time to face their risks and to understand as clearly as possible the meaning of chromosomal abnormalities, Down's syndrome, and neural tube defect, including spina bifida, hydrocephalus or anencephaly. The risk of chromosomal abnormality increases rapidly with maternal age; after the age of 40 it is 1 in 100.

Amniocente counselling

A couple have to understand the degree of risk of congenital defects before they can decide whether they want an amniocentesis and, if these defects are diagnosed, whether they would want an abortion. They also have to accept that amniocentesis carries a small

risk of spontaneous abortion.

The nurse or midwife may be an easier person for the mother to talk to than a doctor, and may be able to explain some of these matters in terms the mother is familiar with. However, most genetic counselling, because of its specialized nature, needs to be carried out by an expert in the subject. The couple will then have all the facts that will help them in their difficult decision on whether to continue the pregnancy.

Abortion

Abortion is the expulsion or removal of the uterine contents before the fetus is capable of surviving separately from the mother. It may occur spontaneously or may be induced.

Spontaneous abortion

Approximately 15% of pregnancies abort spontaneously in the early weeks of pregnancy. This is commonly caused by faulty development or implantation of the embryo. The more spontaneous abortions a woman has the more difficult it is for a subsequent successful pregnancy to occur. When a woman has had three or more spontaneous abortions the nurse or midwife should encourage her to see a gynaecologist if she is anxious to have a baby.

Septic incomplete abortion

This results all too often in death or subsequent infertility, following sepsis. Sepsis may develop because the woman is frightened to admit to an induced abortion, induced illegally by herself or someone else, and so delays seeking medical help. Very often, in malarial areas, the initial fever is self-diagnosed as malaria and medical help is delayed. Nurses and midwives are in an important position to identify incomplete and early septic abortion and to start treatment and refer for medical care.

Induced abortion

The wide range of political, public and religious views about abortion make this a very sensitive subject. Induced abortion is carried out world-wide in epidemic proportions, and in every country there are nearly always herbal or other methods used for inducing abortion even if it is illegal.

Contracept better than abortion

The IPPF continues to strive for better use of contraception to avoid the need for abortion. Abortion carried out to protect the life of the mother is legal in most countries, although some religions are more opposed than others. More than 75% of the population of the world lives in countries where abortion is legal on medical and social grounds or permitted almost on demand. Where there are liberal laws about abortion, deaths from septic abortion have been dramatically reduced. Experience shows that if abortion is carried out legally and very early in pregnancy it can be a safe and simple procedure. This is why pregnancy testing methods are so important, enabling an unwanted pregnancy to be diagnosed early and abortion carried out well before the 12th week. The earlier the abortion the safer it is for the woman.

In countries where abortion is legally available and culturally acceptable the role of nurses and midwives will be in the early diagnosis of pregnancy, in counselling and supporting the woman in this time of conflict and guilt, and in helping decisions over future contraception. Nurses and midwives have great influence as medical educators and one point that should be made by them is that contraception is always preferable to abortion.

In those countries where abortion is not legal and post-abortal treatment difficult to obtain, nurses and midwives will see many women with incomplete or septic abortions. It may require great tact and skill to ensure that these women receive full medical care. They should always be given sympathy and understanding. Continuing support and encouragement over the use of contraception are the positive roles that nurses and midwives can carry out.

Infertility

As a broad generalization, 10% of all couples experience delay in becoming pregnant, but at least half of these are able to have a child with medical help.

This emphasizes the importance of seeking medical advice, but it also presents great difficulties in advising and helping those that remain infertile. It is very uncommon for both partners to be completely infertile. In some situations each partner may be fertile, but as a couple their relative infertility may stop them having children together. Where there is no possibility of the couple having a child, sympathetic handling of the situation is important. Some couples do not want to undergo difficult and time-consuming procedures in the hope of a pregnancy occurring. For all these the possibility of adoption should be borne in mind.

Infertility is described as primary when no pregnancy has ever occurred, and secondary where there has been a previous pregnancy. In developing countries secondary infertility is by far the commonest.

The major causes of infertility

In the woman

Tubal obstruction or dysfunction
Ovulation failure
Uterine factors
Unfavourable cervical or vaginal secretions

In the man

Impaired spermatogenesis
Obstructed epididymis or vas deferens
Defective seminal secretion
Faulty delivery of semen

In the couple

Sexual dysfunction
Mental or psychosexual factors
Immunological incompatibility
Genetic factors
General health factors

The amount of infertility in any community varies throughout the world. Nurses and midwives may receive more requests for help with infertility than contraception, and will see the distress and suffering associated with infertility. The most important causes of infertility in many developing countries are obstruction of the uterine tubes resulting from sexually transmitted diseases, septic abortion, or infection at an earlier delivery.

In some countries where babies are thought of as 'a gift from God', childless couples can be socially ostracized. There is an important role for midwives and nurses in giving accurate advice and in referring suitable couples for medical opinion. Almost more important is their ability to understand the social aspects of infertility for the couple. The couple may find it easier to talk to them about their problems than to a doctor in a hospital.

Social aspec of infertility

Such details would include other sexual liaisons that the husband might have, whether he has children by any other women, in marriages where there are several wives whether the infertile wife receives as much attention as the fertile ones and does she have sexual intercourse on the fertile days. These details and many more can be known and used to build up the background picture of an infertile couple, essential for the doctor to know, but very unlikely for him to learn except through the experience of the local nurse or midwife.

Simple investigations that can be carried out by a nurse or midwife

1. Any marriage that has not produced a pregnancy within one year, if the couple have been together and sexual intercourse has been regular and two to three times a week with semen properly deposited at the cervix, should be suspected of having infertility problems.

2. Male infertility can be initially assessed by asking, discreetly, if the man has made any other woman pregnant and if so how long ago, if he has ever had gonorrhoea or tuberculosis, if he finds any difficulty with sexual intercourse, and what his relationship with his

wife is. His replies may give more information than many medical tests.

3. Ovulation in a woman can also be roughly assessed. Does she have menstrual periods? Are they regular? A record of menstrual dates is easy to keep and a daily temperature chart not difficult (see page 55). Both would give the nurse some idea of whether ovulation was occurring or not. Anovular cycles usually produce no menstrual pain and no tenderness of the breasts pre-menstrually. Therefore, dysmenorrhoea and breast tenderness are encouraging signs that ovulation may be occurring.

4. Tubal damage can often be suspected if there has been a history of pelvic infection following childbirth or abortion (causing secondary infertility) or a history of gonorrhoea, other sexually transmitted diseases or tuberculosis.Serious abdominal disease such as bowel perforation in typhoid fever, or peritonitis from any cause including appendicitis, can cause adhesions round the fimbrial ends of the uterine tubes or round the tubes themselves.

5. Conditions in the uterus causing infertility are most likely to be fibroids or endometritis, commonly tuberculous. There is a greater incidence of fibroids in African women than in Caucasian women, and a nurse or midwife might be able to recognize fibroids by bimanual examination.

6. The cervix should be examined for signs of infection.

By carrying out these investigations much information can be gained and passed on to the doctor. Moreover, the couple will feel supported by the care and interest. Many an infertile woman has become pregnant following one visit to a sympathetic doctor before any tests or treatment have been given, especially if accompanied by her partner. This relaxation of anxiety and tension could be achieved just as easily by the interest and involvement of the nurse or midwife.

Examination of the man

In some cases the examination can be made by a male nurse if this seems more acceptable.

Spermatogenesis may be reduced by local heat; consequently gross obesity, a large hernia or hydrocoele or a varicocoele can increase heat and reduce the number and quality of the sperm. Both testes should be present and hanging low in the scrotum. They should feel firm, smooth and slippery, and if they appear irregular, soft or small, they are abnormal. The epididymis should be so soft it is barely palpable: a hard irregular knobbly or tender mass around the testis suggests infection.

When a sperm count is required the man should be told that to get the best possible result he should produce the specimen at a time when he is in good health (no recent fever, alcohol excess or extreme exertion) and has abstained from sexual intercourse for at least three days. The sample has to be in a suitable container and examined by the laboratory within 30 minutes. It should preferably be produced by masturbation in the vicinity of the laboratory and be warm on arrival.

Sperm coun important

A nurse or midwife may often be shown the written report of a semen sample. The exact interpretation is not her responsibility, but two points are important.

First, there is a wide range of variation in the reports from different laboratories and there is also a wide daily variation in the sperm count in any man. No one sperm count should be taken as final.

If a poor result is reported the man should be encouraged to build up his strength, abstain from sexual intercourse beforehand, and repeat the test. A count of 20,000,000 or more per ml is encouraging enough for one result only. But a "No sperm present" report should be repeated.

Second, when the report is "No sperm present" men are often told that nothing can be done. This is not always true. The nurse or midwife should explain that if the testis itself has stopped producing sperm there is, at present, nothing that can be done. However the testis may be active, as shown by testicular biopsy, but the epididymis or vas deferens may be blocked through infection. Operation by a highly skilled urologist can sometimes bypass the blocked areas and permit sperm to travel up the vas deferens again. A negative sperm count requires very sophisticated and skilled investigation and treatment if help is to be given. This may not always be available and the decision on treatment depends on the doctor.

Education to reduce risk of infertility

The role of the nurse or midwife is of the greatest importance and talks given to primary and secondary schools, colleges, and men's and women's groups carry great influence.

Secondary infertility is mainly the result of infection. The infection may be a pelvic infection following childbirth or abortion in the woman, or tuberculosis or sexually transmitted diseases in either sex.

Pelvic infection

Puerperal infection is much more likely after a traumatic vaginal delivery than a straightforward one, especially if the difficulty was so

Infection causing infertility

great that the child was stillborn. It is also more likely in home deliveries than those in hospital, especially where the mother is delivered lying on the floor of her home. In these circumstances bacterial organisms can easily travel from the floor into the vulva and vagina, affecting any damaged tissues, and into the uterus. Women should be encouraged to have a midwife in attendance, to be delivered on clean cloths and to be raised off the floor in the puerperium. Mothers should be told that any fever in the puerperium should be treated immediately as a genital tract infection, and not self-diagnosed as a fever such as that of malaria.

Post-abortal pelvic infection is so common after illegal abortion that it should be widely taught "If you end this pregnancy you may never become pregnant again". In one developing country with a high rate of illegal abortion, notices displaying this sentence were distributed widely. The all-too-common story of the young woman who had one induced abortion and never became pregnant again must be repeated and explained to the public, especially young girls and boys in schools.

Tuberculosis and gonorrhoea

Throughout developing countries tuberculosis is an important cause of infertility. In some parts of the world tuberculosis is so common and medical services so limited that no attempt to treat or follow-up or identify all the cases of tuberculosis can be made. Patients with pulmonary tuberculosis are also liable to have abdominal or genital infection, and infection in men or women is equally likely to result in infertility. The importance of tuberculosis treatment and control is paramount. The help nurses and midwives can give in identifying cases, ensuring continuing treatment and giving neonatal BCG cannot be over-emphasized.

Gonorrhoea causes infertility by damaging the uterine tubes in women and the epididymis in men. The damaging effect of the infection can be reduced by the man or the woman receiving early effective antibiotic treatment. This must not be discontinued as soon as symptomatic relief has been produced, but the full course of treatment must be completed. In young adolescents the first attack of gonorrhoea often causes damage resulting in infertility.

The dangers of gonorrhoea need to be widely understood, with emphasis on the damage and possible infertility that results, and the particular risks to young adolescents. The value of condoms in preventing transmission of disease and the importance of early treatment of the individual and of contacts is also part of the educational message.